ORAL HEALTH STATUS AND TREATMENT NEEDS OF MALAYALI TRIBES, YELAGIRI HILLS, TAMIL NADU.

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THE TAMIL NADU Dr. MGR MEDICAL UNIVERSITY

CHENNAI

DECLARATION BY THE CANDIDATE

I hereby declare that this dissertation titled **"Oral Health Status And Treatment Needs Of Malayali tribes, YelagiriHills, Tamil nadu"** is a bonafide and genuine research work carried out by me under the guidance of **Dr. M. Shiva Kumar MDS,** Professor and Head of the Department, Public Health Dentistry, Ragas Dental College and Hospital, Chennai.

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I hereby declare that the **The Tamil Nadu Dr. M.G.R. Medical University, Tamil Nadu** shall have the right to preserve, use and disseminate this research work in print or electronic format for academic / research purpose.

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The Lord is my shepherd…… Psalms 23:1

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Dr.F.Delfin Lovelina

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ABSTRACT

Background:

The present study was conducted to assess the oral health status and treatment needs of Malayali tribes, Yelagiri Hills, Tamil nadu.

Objectives:

1. To assess the oral hygiene practices and perception towards oral health among the Malayali tribes in the Yelagiri hills, Tamil nadu.

2. To assess the oral health status and treatment needs of the Malayali tribes in the Yelagiri hills, Tamil nadu using WHO Oral health Assessment proforma 1997.

Methodology:

A cross-sectional descriptive study was conducted to assess the oral health status and treatment needs of 660 Malayali tribes in the Yelagiri Hills. Data was collected using a survey proforma which comprised of a questionnaire and WHO Oral Health Surveys – Basic Methods Proforma(1997). The collected data was subjected to statistical analysis.

Results:

Results showed that among 660 study population, 381(57.7%) had no formal education, 228(34.5%) had not visited dentist before. Of those visited, 409 (61.97%) had visited dentist for toothache and extraction. 426(64.5%) had indigenous brushing habits. A very high prevalence of periodontal disease was observed in this population. The prevalence of dental caries among the study

population was 79.5% and mean DMFT was 5.9. 212(32.12%) were edentulous in the upper arch and 238(36%) were edentulous in the lower arch. 253(38.4%) had generalized attrition, 132(20%) had generalized attrition and abrasion. In this study, deep rooted beliefs and customs regarding dentition and dental treatment prevailed.

Conclusion:

The oral health status of Malayali tribes was poor with high prevalence of periodontal disease and dental caries. Regular oral examination by dental professionals, dental health education and motivation to maintain oral hygiene should be insisted to improve the oral health status of this community.

Key words:

Malayali tribes, oral health status, WHO oral health proforma, Beliefs.

INTRODUCTION

"He who has health has hope; and he who has hope has everything"

-Arabian Proverb

Health is a state of complete well being free from any discomfort and pain. There should be continuous adjustment with the environment to ensure optimal function of our body. Health is multifactorial, the factors, which influence health, are both within the individual and externally in the society and environment in which he or she lives[1]. Oral health is a standard of the oral and related tissues which enables an individual to eat, speak and socialize without active disease, discomfort or embarrassment and which contributes to general well being[2].

Despite remarkable world-wide progress in the field of diagnostic, curative and preventive medicine, still there are large populations of people living in isolation in natural and unpolluted surroundings far away from civilisation, maintaining their traditional values, customs, beliefs and myths. They are commonly known as tribes and are considered to be the indigenous people of the land.

The **Imperial Gazetteer of India**, 1911, defines a tribe as a "collection of families bearing a common name, speaking a common dialect, occupying or professing to occupy a common territory and is not usually endogamous though originally it might have been so".

India has the second largest tribal population of the world next to the African countries. About half of the world's autochthonous people live in India[3], thus making India home to many tribes which have an interesting and varied history of origins, customs and social practices. The primitive tribal communities (comprising 635 tribal communities) have been identified by the Government of India on the basis of their pre agricultural level of technology, extremely low level of literacy and small, stagnant or diminishing population. Health is a prerequisite for normal human development and is essential to the well being of man- kind. Oral health is an important component of general health and can impact on a person's ability to eat, speak or socialise[4].

The health problems of any community are influenced by the interplay of various factors including social, economic and political. People's beliefs, customs and practices are also important influencing factors on health[5]. An individual's willingness to seek health care is influenced by health attitudes, knowledge about health care, and the social and cultural definitions of health and illness that have been learned[6]. Ethnic beliefs and values may act to reinforce or inhibit the use of health services[7] and research has shown that low socio-economic and ethnic minority groups are less likely to utilise health services[8].

In addition, they have been observed to be malnourished with many practising unhealthy lifestyles like tobacco and alcohol use. Such behaviors can be detrimental to general health, as well as contributing to a deterioration of the oral health, especially the periodontal tissues and oral mucosa.

In spite of the tremendous advancement in the field of preventive and curative medicine, the health care delivery system in these primitive tribal people are still poor and need to be strengthened in order to achieve the goal of Health for all in the country.

A number of anthropological studies have documented the health status of the malayalis tribes[9] **(Annexure 1,2)**, but no study has ever been reported on the oral health status of this population in the available literature[10], hence this study was contemplated with an aim to assess the oral health status and treatment needs of the Malayali tribes of Yelagiri hills, in order to provide an oral health status data base and to plan dental public health programmes with the above data for this community, as Assessment of the oral health status and associated behaviors is essential in planning to provide oral health care services to this population.

AIM AND OBJECTIVES

AIM:

To assess the oral health status and treatment needs of Malayali tribes in the Yelagiri hills, Tamil Nadu.

OBJECTIVES:

1. To assess the oral hygiene practices and perception towards oral health among the Malayali tribes in the Yelagiri hills, Tamil Nadu.

2. To assess the oral health status and treatment needs of the Malayali tribes in the Yelagiri hills, Tamil Nadu using WHO Oral health Assessment proforma 1997.

REVIEW OF LITERATURE

Kadir RA, Yassin AT (1989)[11] conducted a study to identify beliefs on oral health, common oral hygiene practices carried out as well as the attitudes among the Aborigines of the Selangor Orang Asli towards modern dental services. An open-ended structured and voluntary questionnaire survey was conducted. Of the 164 respondents, 61% aborigines adults answered they had experienced toothache before, 28% had bleeding gums and of those who had bleeding gums 11.5% attempted to treat the condition. Of these only 1.2% went to see the dentist, the rest still in traditional or conservative treatment methods. 48.9% believed "worms" to be the toothache causative factor while 7.9% mentioned "bacteria". The ratio of those using modern toothbrushes to traditional methods was 2.1. The frequency of cleansing habits however varied. Tooth brushing frequency was found to be associated with bleeding gingiva occurrence at $p < 0.005$. 4.3% still went to their medicine men for treatment for both dental caries and periodontal problems. The pattern however appear to be changing for dental caries since at least one third of those in pain decided to see dentist for treatment.

Salonen L., et al. (1990)[12] reported on occurrence of oral mucosal lesions and the influence of tobacco habits in a randomly selected adult Swedish population. Nine hundred twenty (95%) of the selected samples of 967 subjects comprising approximately 0.75% of the total adult population were examined; lesions were registered in 596 of the 920. The relationship between tobacco habits and mucosal lesions was analysed and the time needed for treatment for the lesions was estimated. A positive correlation could be demonstrated between

tobacco use and leukoplakia, frictional white lesion, coated tongue, hairy tongue and excessive melanin pigmentation, while a negative correlation was observed for geographic tongue and aphthous ulcers. The estimated mean time required for registration and management of oral mucosal lesions in the studied group of adults was 24 min per individual.

Dowsett SA, Archila L, Segreto VA, Eckert GJ, Kowolik MJ (2001)[13] conducted a study on 239 subjects aged 12–75 years to determine the periodontal disease status of an indigenous Indian community of rural Central America (San Juan La Laguna, Guatemala) by a full-mouth periodontal examination on 6 sites per tooth (mesio-buccal, mid-buccal, distobuccal, disto-lingual, mid-lingual and mesio-lingual) on all existing teeth, including the third molar only if a first and/or second molar was absent from the same quadrant. Gingival health was recorded using the gingival index (Loe & Silness 1963). Pocket probing depths (PPDs) were measured to the nearest millimeter using a UNC 15 probe (Hu-Friedy, Switzerland). The high prevalence of pocketing was confirmed and 90% of adults >35 years had at least one site with CAL >6 mm. However, extensive disease was restricted to a small minority, with only 10% of adults >35 years having 20% or more sites with CAL >6 mm.

Amarasena N, Ekanayaka AN, Herath L, Miyazaki H. (2002)[14] Conducted a cross-sectional community based study in a sample of 2277 rural adult males aged 20–60years, to detect the periodontal status of male smokers and betel chewers in a rural community in Sri Lanka and compare it with that of male nontobacco users of the same community. Periodontal status was assessed by

clinical measurement of levels of bacterial plaque (PLI), gingival inflammation (GI) and loss of epithelial attachment (LA). All measurements were carried out on four sites of all teeth present except third molars. The younger age group had significantly better periodontal status than the older age group as measured by all periodontal indicators whether PLI, GI or LA ($P<0.0001$). A significant difference existed in all three periodontal parameters between smokers, betel chewers and nontobacco users ($P<0.0001$). Betel chewers had significantly higher levels of both PLI and GI in comparison with smokers and non-tobacco users ($P<0.05$).

Nawell PL (2002)[15] conducted a study among a rural highland community in New South Wales, Australia using multistage cluster sampling method. A total of 871 subjects were examined by the dental therapist. Examination was carried out using WHO oral health assessment criteria 1977. Before oral examination each person were asked to answer a short interview questionnaire regarding their socioeconomic and demographic data, perceived oral status and past dental treatment, dietary variables, oral hygiene practices, oral habits, drinking water source and knowledge of traditional practices related to oral diseases and their prevention. The study showed DMFT (3.94± 6.4) scores increased with age but remained a low caries range until the age of 45 years. Root caries started after 20 years of age and by 30-44 years 45% of DMFT was due to root caries. 93% of the subjects needed immediate care. Nearly 60% of the total sample needed fillings and 36% needed extractions. 98% needed oral hygiene instructions, 70% required calculus removal. 57% males and 28% females were smokers. Male smokers aged 30-44 years had significantly more white patches than nonsmokers.

Baelum V et al (2003)[16] conducted a study among 359 rural Thai adults from the Province of Songkhla in Southern Thailand to describe the periodontal conditions among 30–39- and 50–59-yearold. Clinical examination of plaque and calculus in six teeth and bleeding on probing, attachment level and pocket depth in six sites of all teeth present, except third molars were done. Results showed that the oral hygiene conditions were poor with abundant amounts of both plaque and calculus. Gingival bleeding was essentially ubiquitous. The prevalence of attachment loss was 92% among 30–39-year-olds and 100% among 50–59-year-olds.

Van Wyk PJ and Van Wyk C. (2004)[17] conducted a study to describe the oral health status of the inhabitants of, and possible trends in oral diseases in South Africa. The results of the study showed that 39.7% of the -year-old children were caries free, with DMFT of 1.1 for the 12-year-old group. Based on the Unmet Treatment Need Index more than 80% of caries in children were not treated. The greatest need for the treatment of dental caries in South African children was for preventive services, restorations and extractions.

Endean C, Roberts-Thomson K, Wooley S (2004)[18] conducted a study to describe oral health in the Anangu Pit- jantjatjaraku lands in South Australia on 356 adults and 317 children. Data on dental caries is presented as the DMFT index (dmft for deciduous teeth) and records the tooth specific cumulative effect of dental caries experience: decayed (D), missing (M) or filled (F) because of dental caries for permanent teeth (T). The surface specific (DMFS/dmfs) index records the caries experience of each of the tooth surfaces. In children the prevalence of

gingivitis was reported as a modified gingival index. The Community Periodontal Index (CPI) was used to measure periodontal status for the adult survey. Mean dmft of 5-6 years old was 3.20, DMFT of 18 to 24 years old 3.86 and 45+ years 8.5. 91.7% of the children had gingivitis while adults 63.9% had calculus, with 79% having periodontal pocketing and 45.7% with pocketing greater than 6mm. Advanced periodontal disease was strongly correlated with diabetes in this population. Tooth loss was found more frequently among adults with diabetes (mean 5.51) than non-diabetics (mean 1.53). Most adults presented for 'emergency care' or an urgent dental problem (46.7% of all adult visits). Dental caries experience is probably significantly modified by the high concentrations of fluoride in reticulated groundwater.

Kumar ST et al (2006)[19] conducted a cross sectional study of Bhil tribal adults in Rajasthan, India to investigate the association of age, oral hygiene and dental visiting practices with oral health status. Study population was selected using multi stage stratified random sampling method. A total of 1590 male tribal dentate subjects aged 15-54 years were examined. Clinical recordings of oral hygiene status (OHI – S), caries status (DMFT and DMFS) and treatment needs, and periodontal status (CPI) was carried out. The study showed an increase in Debris, calculus, oral hygiene index and DMFT scores with age. More than 57% of the population exhibited poor oral hygiene status. The overall mean DMFT and DMFS scores were 5.34±6.48 and 18.94 ± 35.87 respectively. Extraction (53%) was the most required treatment (1.74 ± 3.66 teeth) followed by (30%) one surface fillings (1.34 ± 1.65 teeth). Shallow periodontal pockets (40%) were prevalent among the 35 – 44 years age group whereas deep pockets were most

common in the oldest age group. ANOVA revealed a significant difference in treatment needs among the different age groups (P<0.0001).The study population was characterized by a lack of previous dental care and high treatment needs.

Jamieson L, Armfield JM, Roberts-Thomson KF (2006)[20] conducted a study on oral health inequalities among indigenous and non- indigenous children in the northern territory of Australia. 12,584 children were examined, 64.9% were indigenous. Across all age groups higher mean dmft and DMFT were experienced by indigenous children than non-indigenous group. Indigenous children of 5years had almost 3times dmft (4.3) than non-indigenous dmft (1.3) at p<0.05. 13 year old indigenous children experienced the highest mean DMFT levels (1.8) and this was 2.3 times the DMFT score of the (0.8) non-indigenous counterparts in the same disadvantaged category.

Kasim BA, Noor MA, Chindia ML (2006)[21] conducted a cross-sectional descriptive study on oral health status among 141 kenyans age ranged between 18 and over 65years, in a rural arid setting to determine the dental caries experience and knowledge on the causes and preventive measures for dental diseases. Oral examination was performed under natural light using probes and mouth mirrors and diagnosed using WHO guidelines. A questionnaire was administered to evaluate knowledge on the cause and prevention of dental caries and gum diseases, chi-square test was carried out to determine the significance of the associations. Results showed 56.7% of the subjects were caries free and a higher caries prevalence among illiterates. Percentage of females with dental caries was higher than males but was not statistically significant (p=0.053). 43% of the

subjects had no knowledge on the causes of decay and gum diseases. Mean DMFT was the highest in the 45-54 year age group and lowest in the above 65 year age group. Mean DMFT for all ages were 3.4.

Bhat M (2008)[22] conducted a study on 1000 samples (599 males and 401 females) to assess the oral health status and treatment needs of a rural Indian fishing community using convenient sampling. The survey was carried out using the WHO 1997 criteria in natural daylight. Clinical examination was done to assess oral mucosal conditions, temporomandibular joint disorders, developmental enamel defects, fluorosis, periodontal conditions, dental caries status, prosthetic status, malocclusion status and treatment needs. All the required information regarding the community like the routine work, cultural practices, location etc was obtained. The data were collected by means of "Shoe leather epidemiology' or a door-to door survey and at places of work. Informed consent was obtained prior to examination of each subject. The fishing community had poor access to dental care. The results of this survey revealed that a large percentage of the population was afflicted with dental caries and periodontal disease. A maximum number of subjects scoring healthy periodontal status was found to be in the younger age groups and the number gradually decreased as age increased. The highest number 67 (69.79%) out of the 96 subjects scoring healthy were found in the 5–9-year age group. In the 40–44-year age groups, only 3 (2.48%) out of the 86 subjects examined scored healthy sextants. In the 50 years and above age group, 2.66 mean sextants had pockets of infection 6mm or deeper. 78% of the subjects were affected by dental decay, the mean DMFT score was found to reach 9.91 in the 50 years and above age group. Dental fillings were virtually non- existent in the study

population the unmet treatment need was found to be high in the study population.

Badgujar SB, Mahajan RT and Kosalge SB. (2008)[23] conducted an ethnobotanical study to investigate the traditional Practice for Oral Health Care and the uses of medicinal plants for oral health care by different aborigines, such as Bhills, Gavits, Kokanis, Mavachis, Valvis, Pawras, Koknas and Vasaves, in the Nandurbar district of Maharashtra, India. Data were collected by interviewing native people, mainly elderly – engaged in farming and stock rising activities, housewives and local traditional medicine men of different villages. The study results indicated that many tribal communities of visited villages of Nandurbar district still continue to depend on plant resources to meet their day-to-day needs and use plant based formulations from generation to generation for treatment of health related problems. Aghada Stem is used as toothbrush. Toothbrush of neem stem is valued for healthy teeth and gums; paste or juice of stem is applied for swelling or bleeding of gums. Mango tree twigs used as toothbrush and was used to cure toothache; latex is applied to relieve gingivitis. Cotyledon is fried in mustard oil and the smoke is inhaled through the mouth and kept closed for about 10 minutes to relieve dental caries.

Jamieson LM, Roberts-Thompson KF, Sayers SM (2010)[24] conducted a study to determine dental caries among a birth cohort of Australian Aboriginal young adults. DMFT was higher among females and those who did not own a tooth brush, dentally anxious and those with visible plaque deposits. Mean DMFT was 4.84 (95% C.I 4.4 – 5.3). As a result the risk indicators for dental caries included social determinants such as household size, dietary behaviours such as

regular consumption of soft drink and sweets, dental behavior such as non-ownership of a toothbrush and dental anxiety.

Kumar A, Virdi M, Veeresha KL, Bansal V (2010)[25]conducted a cross-sectional descriptive study in 12 villages of Ambala district, Haryana, India to assess the oral health status and treatment needs among rural population of Ambala on 1250 subjects aged 20 – 74 years using modified WHO format 1997 and interview using structured questionnaire. The prevalence of oro-mucosal lesions was 15%, with 80% in males occurring mostly on buccal mucosa and leukoplakia significantly higher. The mean DMFT was 5.2 and was higher in females and were significantly related to age. Treatment needs were extraction followed by one surface filling. Maximum CPITN score was significantly related to educational status, smoking and alcohol habits ($p< 0.05$). Prosthetic needs were higher for mandibular arch. Nearly 90% of the subjects needed one or other form of dental treatment.

PHOTOGRAPHS

1. BOSCO INSTITUTE OF TECHNOLOGY

2. TYPICAL HOUSE STRUCTURE OF THE TRIBES

3. TRIBAL INHABITANTS OF YELAGIRI HILLS

4a. ORAL EXAMINATION

4b. ARMAMENTARIUM

5. HEALTH EDUCATION IN THE SCHOOLS

6. DENTAL CAMP

6 (a) INAUGURAL FUNCTION

6 (b) DENTAL CAMP

MATERIALS AND METHODS

I. BACKGROUND OF STUDY

The present study was done to assess the Oral Health Status of the Malayali tribes in the Yelagiri hills, Tamil Nadu.

II. BACKGROUND OF THE STUDY AREA

The present study was conducted in Yelagiri hills during September 2010 to March 2010, among the Malayali tribes to assess their oral health status and treatment needs.

Situated halfway between Chennai and Bangalore and positioned at an elevation of 920m above sea level, Yelagiri is a huddle of tiny villages, which extend over four hills. Yelagiri comprises 14 small villages, situated in the Jawadh Hill ranges of the Eastern Ghats in Vellore District **(Annexure 1)**, Inhabited by tribal people; the Yelagiri hills are still comparatively secluded. The tribal people "malayali" **(Photograph 3)**, who live here are engaged in agriculture, horticulture, forestry, etc.

III. STUDY POPULATION

The inhabitants of the 14 villages of the Yelagiri hills, who have completed 18years and residing for more than 15years were included in the study. Hence, the total study population comprised of about 4,753 approximately.

IV.OBTAINING THE APPROVAL FROM AUTHORITIES

Ethical clearance to conduct the study was obtained from the Institution Review Board of Ragas Dental College and Hospital **(Annexure 3)**. Further, permission was also obtained from the Village panchayat leader where the study was carried out **(Annexure 4 a and b).** Informed consent was collected from individual subjects after explaining the purpose of the study **(Annexure 5).**

V. INCLUSION AND EXCLUSION CRITERIA

INCLUSION CRITERIA

1. Inhabitants of the villages aged 18 to 75 years who were residing for more than 15years and present on the day of examination and who were willing to participate in the study were included.

EXCLUSION CRITERIA

1. Individuals who have migrated from Yelagiri hills were excluded.
2. Inhabitants who were reluctant to participate in the study were excluded.
3. Inhabitants who had history of any systemic illness like diabetes mellitus, hypertension etc. which might affect the outcome of the study.

VI. SAMPLE SIZE DETERMINATION.

1. **PILOT STUDY:** A pilot study was undertaken on September 2010 in the Bosco institute of Technology **(Photograph 1)** Athanavoor, Yelagiri hills

to determine the feasibility of the study and also to determine the sample size as earlier documented oral health status of this tribal population were sparse. The study population included was 40. Based on the pilot study, the questions on utilization of dental services and oral hygiene practices were slightly modified for the main study. It took an average of 15-20 minutes to complete the proforma and questionnaire

As per the pilot study, the prevalence of the oral mucosal lesions was 40% and it was taken for sample size calculation.

i) SAMPLE SIZE DERIVATION:

Sample size calculation was done using the formula given below.

$$n = \frac{z^2pq}{d^2}$$

$$= \frac{(2)^2 \times 40 \times 60}{4^2}$$

$$= 600 + 10\%$$

$$= 600 \rightarrow 660 \text{ (approximately)}$$

Z (Confidence Interval 95 %) = 2

p = prevalence =40 %

q = 1-p = 60%

d = allowable error = 4%

i) STUDY SAMPLE AND SAMPLING PROCEDURE

The study sample for the present study was selected using cluster random sampling method.

The study methodology for sample size division was as follows

1. Athanavoor - 48
2. Kottaiyoor - 47
3. Manjankolli pudoor - 55
4. Puthoor - 53
5. Thayaloor - 46
6. Mettukaniyoor - 54
7. Pallakaniyoor - 57
8. Padanoor - 55
9. Nilavoor - 59
10. Mangalam - 69
11. Kotoor – 57
12. Rayaneeri - 60

VII. IMPLEMENTING THE STUDY

a. PROFORMA and DATA COLLECTION

Data was collected from a cross-sectional survey, using a Survey Proforma which comprised of a Questionnaire, and Clinical examination.

(i) QUESTIONNAIRE and DEMOGRAPHIC DATA

A pre-tested questionnaire which included Demographic data, tobacco habits, questions to assess utilization of dental care services, beliefs and oral hygiene practices were collected from the individuals prior to the clinical examination.**(Annexure 6)**

(ii) CLINICAL EXAMINATION

An intra-oral examination was carried out by a single examiner to assess the Oral Health Status of the Malayali tribes of Yelagiri hills using WHO Oral Health Surveys – Basic Methods Proforma (1997) **(Annexure 7)**.

b. EXAMINATION AREA

Examination was conducted in all the 12 villages (two small villages clubbed with the nearby villages) under bright natural light, by positioning the subject so as to receive sufficient daylight.

c. EXAMINATION POSITION

The subjects were made to sit on a chair with comfortable arm rest facing the light in an upright position with sufficient head rest. Type-III clinical examination as recommended by American Dental Association (ADA)

specification was followed. The examiner was seated in front of the subject. The trained data recorder was seated on the left side of the patient close to the examiner, so that data recorder was able to hear the examiner's instructions and codes and also the examiner was able to see the data being entered. **(Photograph 4a)**

d. INSTRUMENTS AND MATERIALS USED (Photograph 4b)

Examination was carried out with the help of the following:

- Mouth mirrors
- CPI probe
- Tweezers
- Cotton rolls
- Kidney trays
- Sterilizing solution
- Chip blower
- Cotton holder
- Disposable gloves and masks

Autoclaved instruments were used and adequate number of each instrument was carried. During data collection, chemical method of disinfection and sterilization using Korsolex (Glutaraldehyde- 7gms; Polymethyl urea derivatives- 11.6 gms; 1,6 dihydroxy 2,5 droxyhexane - 8.2gm) diluted by adding 1:9 water was used. Used instruments were washed and placed in the disinfectant solution (for 30 minutes), then re-washed and drained well. After each day of examination, the entire sets of instruments were autoclaved.

VIII. EXAMINATION, ORAL HEALTH EDUCATION AND TREATMENT REFERRAL

Each individual was examined for 15-20 minutes after the questionnaire was completed. Around 25 people (approximately) were examined per day. After the oral examination, a brief oral health education session was conducted in the local language (Tamil). The findings of the survey were reported then and there to the people and those requiring treatment were provided treatment by arranging Dental Camp which was organized by Ragas Dental College and Hospital in co-operation with Bosco institute of Technology, Yelagiri hills, Vellore District. Rector.Father Vincent Durai Raj, Director of Bosco institute of Technology presided over the function **(Photograph 6).** Dentists from Ragas Dental College and local dental practitioners participated in the dental camp. Individuals who required further dental treatment were referred to nearby private dental clinics in Tirupattur town for dental treatment.

IX. STATISTICAL ANALYSIS:

The data recorded were transferred and tabulated to the computer - Windows Microsoft Excel (2007) - for the purpose of the data analysis. SPSS version15 was used for statistical analysis. The alpha error (Type I error) was assumed to be 0.05. 95% confidence limit was set for the above analysis. Chi-square test for quantitative and Mann-Whitney U test for qualitative data were used for compare the prevalence of oral diseases and oral health practices between males and females.

RESULTS

The present study was done to assess the oral health status and treatment needs of Malayali tribes of Yelagiri hills, Tamil nadu. The reference population comprised of a population of around 4537 among whom this study was done on a population of 660. The study population were obtained from twelve villages of Yelagiri hills,Tamil nadu.

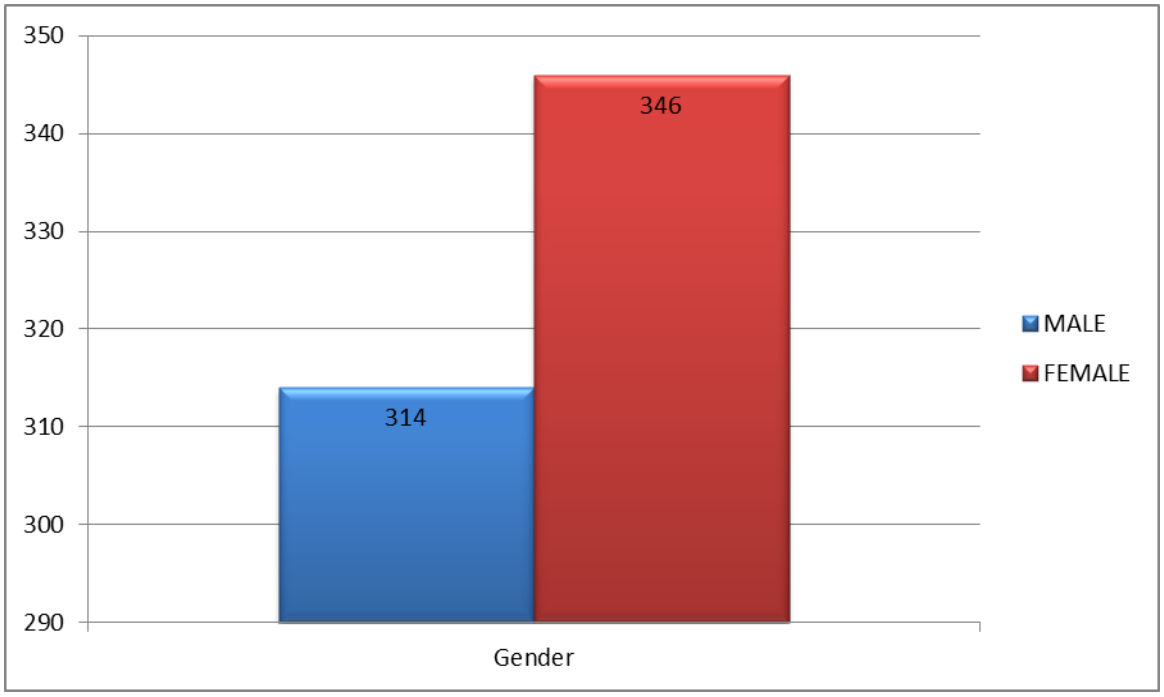
Table 1 and graph 1 shows that the study population consisted of 314 (47.58%) Males and 346 (52.42%) Females, with a mean and standard deviation of 40.18 and 39.27 for Males, and 14.206 and 14.061 for Females respectively. Statistically, there was no significant difference between sex and mean age of the study population. (F = 2.457; p = .118)

Table 1: Distribution of study population based on sex and mean ages:

Gender	Male	Female
Number of samples	314 (47.58%)	346 (52.42%)
Mean	40.18	14.206
Standard deviation	39.27	14.061

F = 2.457; p = .118 (non – significant)

Graph 1: Distribution of study population based on sex



F = 2.457; p = .118 (non – significant)

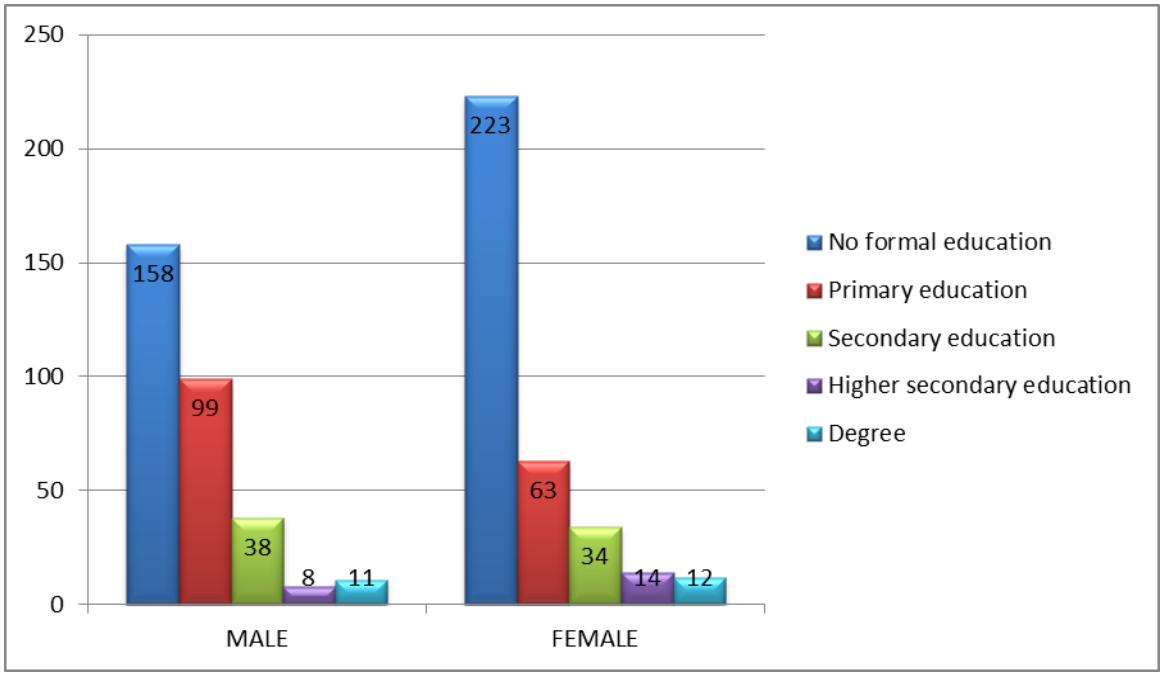
Table 2, graph 2 shows the distribution of study population based on education. Among 660 study population, majority 381(57.7%) had no formal education, 162(24.5%) had primary education, 72(10.9%) had secondary education, 22(3.3%) had higher secondary education and 23(3.5%) hold a degree. Majority of the females 223(64.5%) and males 158(50.3%) had no formal education. 12(3.5%) females and 11(3.5%) males were degree holders. Statistically, there was a significant difference between gender of the study population and education. (Chi-square = 19.486; p=0.001)

Table 2: Distribution of study population based on education

Education	Male (n= 314)	Female (n=346)	Total (n=660)
No formal education	158(50.3%)	223(64.5%)	**381 (57.7%)**
Primary education	99(31.5%)	63(18.2%)	**162 (24.5%)**
Secondary education	38(12.1%)	34(9.8%)	**72 (10.9%)**
Higher Secondary education	8(2.5%)	14(4.0%)	**22 (3.3%)**
Degree	11(3.5%)	12(3.5%)	**23 (3.5%)**

Chi-square = 19.486; p=0.001 (significant)

Graph 2: Distribution of study population based on education



Chi-square = 19.486; p=0.001(significant)

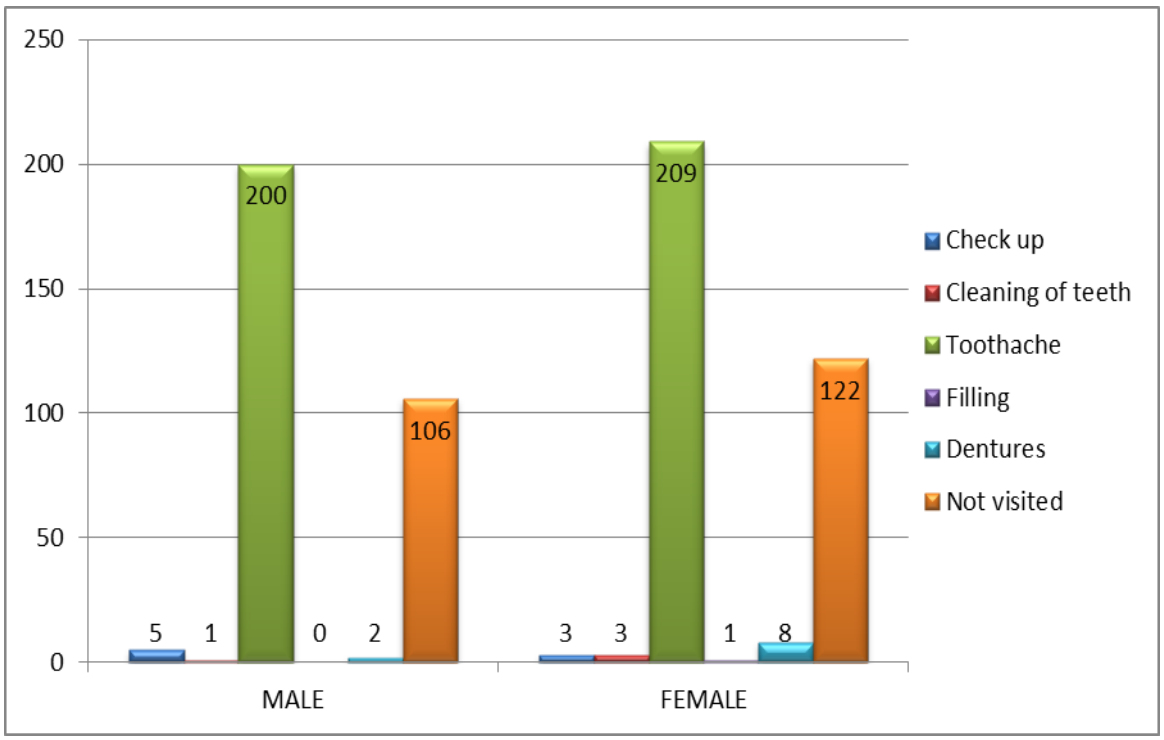
Table 3, graph 3 shows the distribution of study population based on the reason for their last dental visit. Among 660, 228(34.5%) have never visited dentist, of which 106(33.8%) were males and 122(35.5%) were females. 409(62%) had visited dentist due to tooth ache, of which 200(63.7%) were males and 209(60.4%) were females. 1(0.2%) had visited dentist for filling the teeth, 8(1.2%) had visited dentist for checkup, 4(0.6%) visited dentist for cleaning their teeth and 10(1.5%) had visited dentist for dentures. Statistically, there was no significant difference between gender of the study population and reason for last dental visit. (Chi-square = 5.883; p=0.318)

Table 3: Distribution of study population based on the reason for last dental visit

Reason for last dental visit	**Male (n= 314)**	**Female (n=346)**	**Total (n=660)**
Check up	5(1.6%)	3(0.9%)	**8 (1.25%)**
Cleaning of teeth	1(0.3%)	3(0.9%)	**4 (0.6%)**
Toothache	200(63.7%)	209(60.4%)	**409 (61.97%)**
Filling of teeth	0(0.0%)	1(0.3%)	**1 (0.15%)**
Dentures	2(0.6%)	8(2.3%)	**10 (1.51%)**
Not visited	106(33.8%)	122(35.5%)	**228 (34.5%)**

Chi-square = 5.883; p=0.318 (non significant)

Graph 3: Distribution of study population based on the reason for last dental visit



Chi-square = 5.883; p=0.318(non significant)

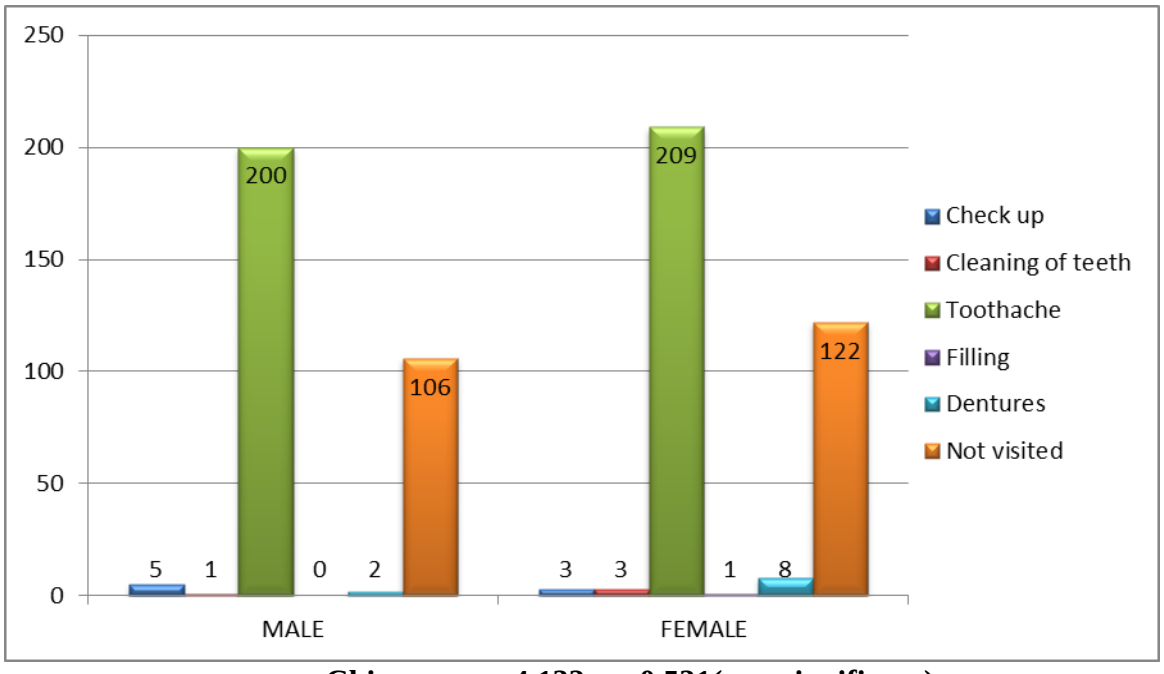
Table 4, graph 4 shows the distribution of study population based on the reason for not visiting dentist. 160(24.2%) reported that they never had any dental problem, of which 80(25.5%) were males and 80(23.1%) were females. 31(4.7%) were not interested in visiting a dentist, of which 13(4.1%) were males and 18(5.2%) were females. 30(4.5%) used only traditional medicines for dental ailments, of which 12(3.8%) were males and 18(5.2%) were females. 4(0.6%) felt the treatment cost to be high, 2(0.3%) due to lack of dentist nearby. Statistically, there was no significant difference between gender of the study population and reason for not visiting dentist. (Chi-square= 4.132; p=0.531)

Table 4: Distribution of study population based on the reason for not visiting dentist

Reason for last dental visit	Male (n= 314)	Female (n=346)	Total (n=660)
Not interested	13(4.1%)	18(5.2%)	**31 (4.69%)**
Use only traditional medicine	12(3.8%)	18(5.2%)	**30 (4.55%)**
Lack of dentist nearby	0(0%)	2(0.6%)	**2 (0.30%)**
High cost	1(0.3%)	3(0.9%)	**4(0.60%)**
Never had any dental problem	80(25.5%)	80(23.1%)	**160(24.24%)**
Visited	208(66.2%)	225(65.0%)	**433 (65.6%)**

Chi-square = 4.132; p=0.531(non significant)

Graph 4: Distribution of study population based on the reason for not visiting dentist



Chi-square = 4.132; p=0.531(non significant)

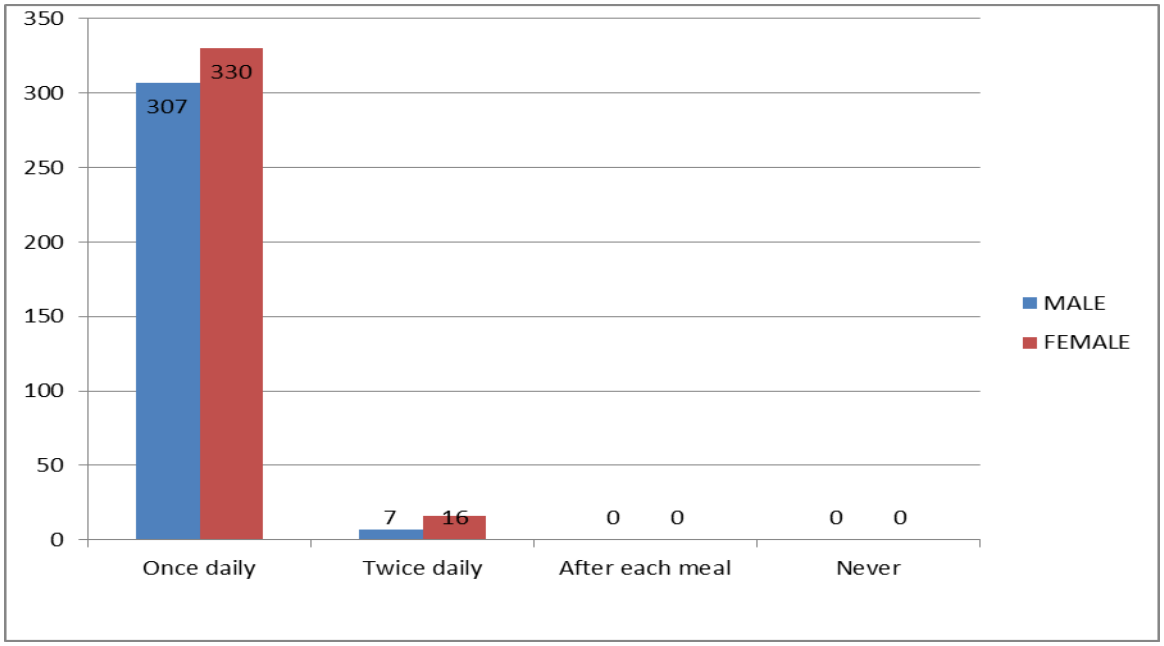
Table 5(a), graph 5(a) shows distribution of study population based on the number of times they cleaned their teeth per day. Majority of the population 637(79%) brushed their teeth once a day of which 307(97.8%) were males and 330(96.5%) were females. About 23(3.5%) of the population who brushed their teeth twice daily, of which 7(2.2%) were males and 16(4.6%) were females. None of the study population had the habit of brushing after each meal or never brushing their teeth. Statistically there was no significant difference between gender of the study population and the frequency of brushing per day (Chi square value = 2.80; p= 0.094).

Table 5(a): Distribution of study population based on the number of times they clean their teeth per day:

Frequency of brushing	**Male (n= 314)**	**Female (n=346)**	**Total (n=660)**
Once	307(97.8%)	330(96.5%)	**637(96.52%)**
Twice	7(2.2%)	16(4.6%)	**23(3.48%)**

Chi square value = 2.80; p= 0.094 (non significant)

Graph 5(a): Distribution of study population based on the number of times they clean their teeth per day:



Chi square value = 2.80; p= 0.094 (non significant)

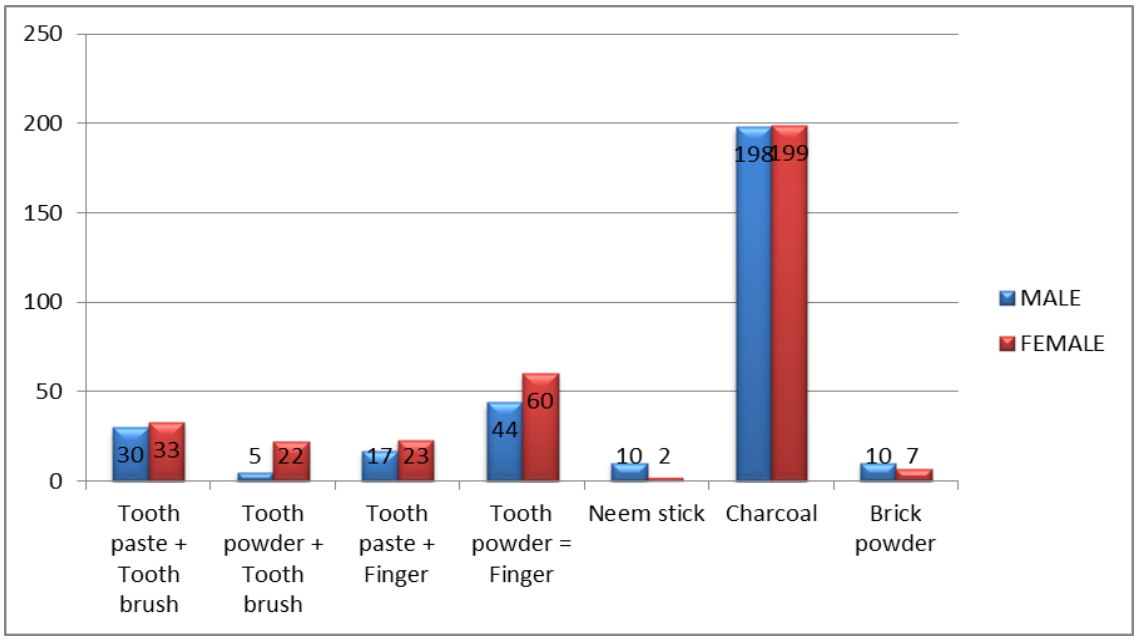
Table 5(b), graph 5 (b) shows distribution of study population based on the materials they use for brushing their teeth. A majority of the study population 397(60.2%) used charcoal for brushing their teeth, of which 198(63.1%) were males and 199(57.5%) were females. 63(9.5%) used tooth paste and tooth brush for brushing, of which 5(1.6%) were males and 22(6.4%) were females. 27(4.1%) used tooth powder and tooth brush for brushing, 40(6.1%) used tooth paste and finger, 104(15.8%) used tooth powder and finger, 12(1.8%) used neem stick, 17(2.6%) used brick powder to clean their tooth. Statistical test showed a significant difference between materials used for brushing and gender. (Chi square value = 18.567; p=0.005)

Table 5(b): Distribution of study population based on materials used for brushing their teeth:

Materials used	Male (n= 314)	Female (n=346)	Total (n=660)
Tooth paste+ tooth brush	30(9.6%)	33(9.6%)	**63 (9.5%)**
Tooth powder+ tooth brush	5 (1.6%)	22(6.4%)	**27 (4.1%)**
Tooth paste + finger	17(5.4%)	23(6.6%)	**40 (6.1%)**
Tooth powder + finger	44(14.0%)	60(17.3%)	**104 (15.8%)**
Neem stick	10(3.2%)	2(0.6%)	**12 (1.8%)**
Charcoal	198(63.1%)	199(57.5%)	**397 (60.2%)**
Brick powder	10 (3.2%)	7 (2.0%)	**17(2.6%)**

Chi-square value = 18.567; p=0.005(significant)

Graph 5(b): Distribution of study population based on materials used for brushing their teeth



Chi-square value = 18.567; p=0.005(significant)

Table 6 (a and b) shows the distribution of study population based on their beliefs regarding dental treatment.

Table 6 (a), shows the distribution of study population based on the general beliefs regarding teeth. 456(69.1%) believed that spacing in the front teeth brings good luck to them, of which 203(64.6%) were males and 253(73.1%) were females. 444(67.3%) believed that cleaning with salt whitens teeth, of which 207(65.9%) were males and 237(68.5%) were females, 571(86.5%) believed that using clove kills germ, of which 265(84.4%) were males and 306(88.4%) were females, 624(94.5%) believed that burying milk teeth helps permanent teeth to grow properly teeth, of which 295(93.9%) were males and 329(95.1%) were females. Statistical test showed no significant difference between the beliefs existed and gender.

Table 6 (a): Distribution of study population based on the beliefs:

Belief	Male (n=314)	Female (n=346)	Total (n=660)
Spacing between front teeth is luck Chi square value =5.532; p=0.19 (significant)			
Yes	203(64.6%)	253(73.1%)	**456(69.1%)**
No	111(35.4%)	93(26.9%)	**204(30.9%)**
Cleaning teeth with salt whitens teeth Chi square value =.495; p=0.482 (non - significant)			
Yes	207(65.9%)	237(68.5%)	**444(67.3%)**
No	107(34.1%)	109(31.5%)	**216(32.7%)**
Placing clove in decayed tooth for cure Chi square value =2.308; p=0.129 (non - significant)			
Yes	265(84.4%)	306(88.4%)	**571(86.5%)**
No	49(15.6%)	40(11.9%)	**89(13.5%)**
Burying milk teeth in soil will cause permanent teeth to erupt in normal position Chi square value =.413; p=0.520 (non - significant)			
Yes	295(93.9%)	329(95.1%)	**624(94.5%)**
No	19(6.1%)	17(4.9%)	**36(5.5%)**

Graph 6(a): Distribution of study population based on the beliefs

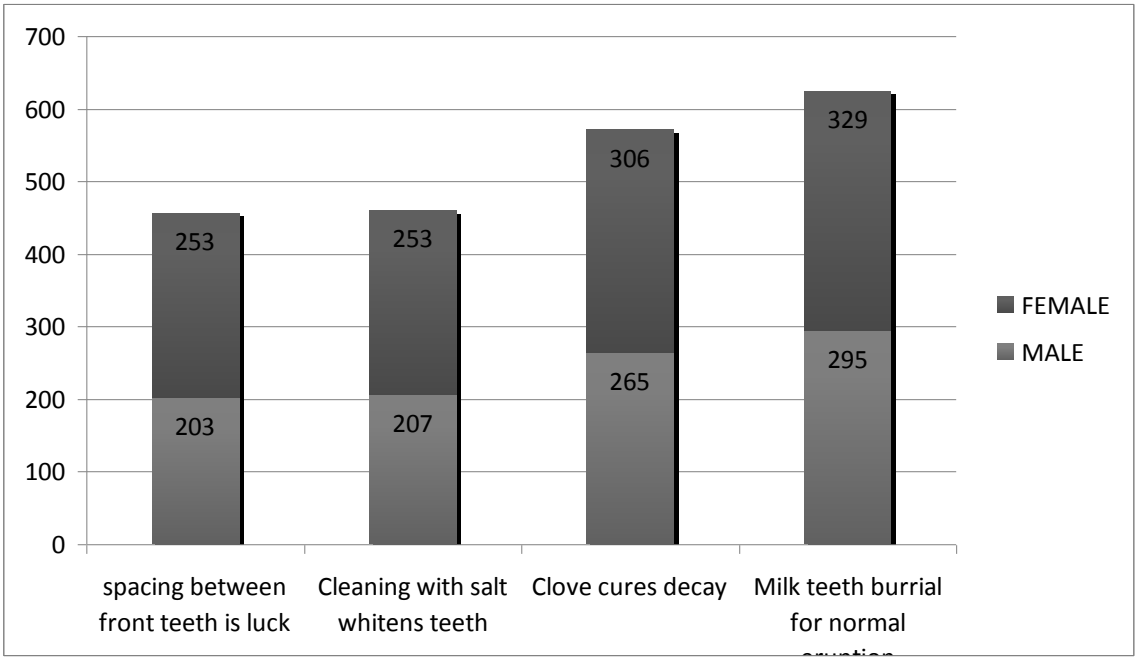


Table 6(b), shows the distribution of study population based on the dental treatment beliefs. 547(82.9%) stated that they won't undergo treatment on Tuesdays and Fridays, of which 259(82.5%) were males and 288(83.2%) were females. 535(81.1%) stated that they won't undergo dental treatment in the evening, of which 246(78.3%) were males and 289(83.5%) were females. 429(65%) believed that the extraction of upper tooth leads to blindness, of which 196(62.4%) were males and 233(67.3%) were females 508(77%) believed that dental treatment is always painful, of which 251(79.9%) were males and 257(74.3%) were females. 470(71.2%) believed that extraction of single tooth loosens other also. Statistical test showed no significant difference between the dental treatment beliefs and gender

Table 6 (b): Distribution of study population based on the dental treatment beliefs:

Belief	Male (n=314)	Female (n=346)	Total (n=660)
Dental treatment on Tuesdays and Fridays Chi square value =.066; p=0.798 (non - significant)			
Yes	55(17.5%)	58(16.8%)	**113(17.1%)**
No	259(82.5%)	288(83.2%)	**547(82.9%)**
Dental treatment in the evenings Chi square value =2.897; p=0.90 (non - significant)			
Yes	68(21.7%)	57(16.5%)	**125(18.9%)**
No	246(78.3%)	289(83.5%)	**535(81.1%)**
Extraction of upper tooth leads to blindness Chi square value =1.752; p=1.86 (non - significant)			
Yes	196(62.4%)	233(67.3%)	**429(65%)**
No	118(37.6%)	113(32.7%)	**231(35%)**
Extraction of a single tooth loosens all the other too Chi square value =.931; p=.335 (non - significant)			
Yes	218(69.4%)	252(72.8%)	**470(71.2%)**
No	96(30.6%)	94(27.2%)	**190(28.8%)**
Dental treatment is always painful Chi square value =2.974; p=.085 (non - significant)			
Yes	251(79.9%)	257(74.3%)	**508(77%)**
No	63(20.1%)	89(25.7%)	**152(23%)**

Graph 6 (b): Distribution of study population based on the dental treatment beliefs

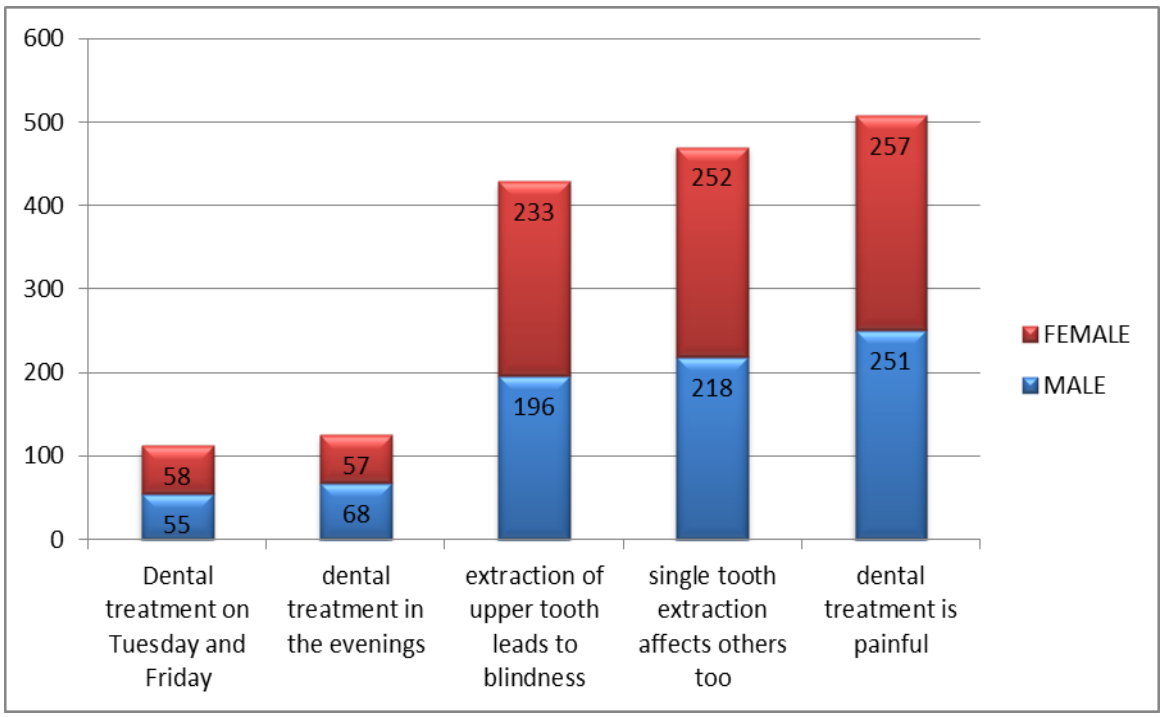


Table 7 shows that among 660 population, 470(71.21%) had no habit of tobacco usage.

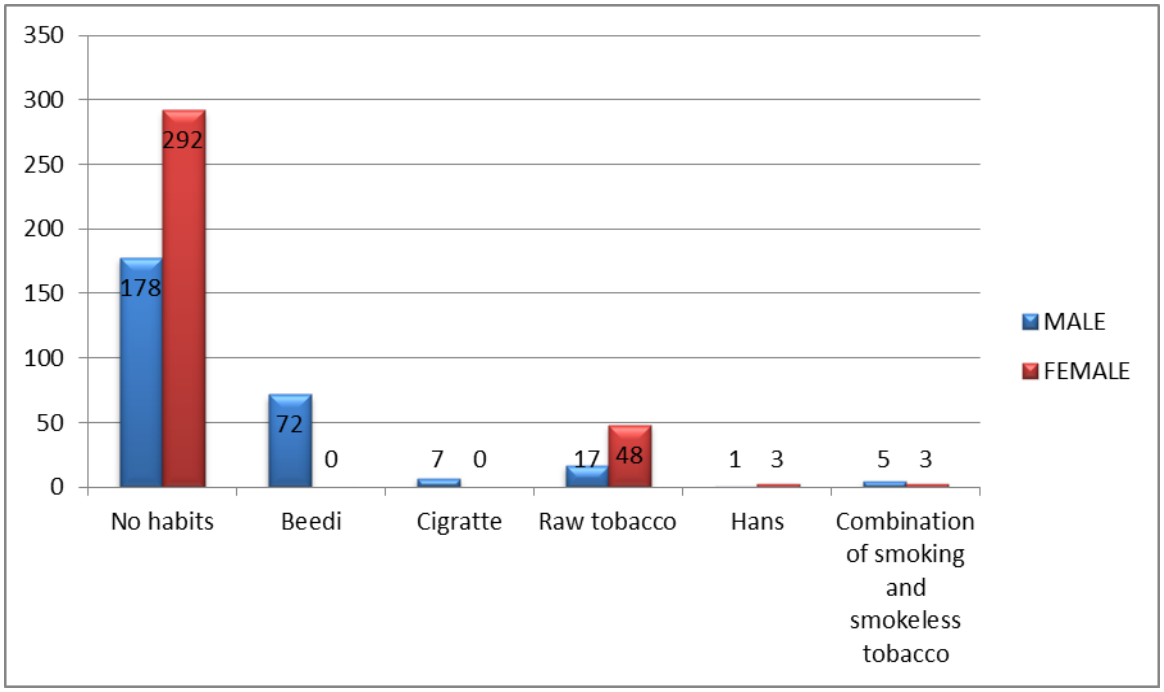
Table 7(a) shows distribution of study population based on the type of tobacco used. Among the total study population 470 (71.21%) had no habit of tobacco usage. 72(10.9%) males had the habit of smoking beedi, 7(1.06%) males had the habit of smoking cigarette, 65(9.85%) had the habit of raw tobacco, of which 17(5.42%) were males and 48(13.87%) were females. 18(2.73%) had the habit of chewing Hans of which 15(4.78%) were males and 3(0.87%) were females. 28(4.24%) had a combination of smoking and smokeless tobacco usage. Statistical tests showed a significant difference between tobacco habits and gender (Chi-square value = 10.347; p = 0.004 (significant).

Table 7(a): Distribution of study population based on the type of tobacco used

Habit	Male (n= 314)	Female (n=346)	Total (n=660)
No habits	178(56.68%)	292(84.39%)	**470(71.21%)**
Beedi	72(22.93%)	0(0%)	**72(10.9%)**
Cigratte	7(2.22%)	0(0%)	**7(1.06%)**
Raw tobacco	17(5.42%)	48(13.87%)	**65(9.85%)**
Hans	15(4.78%)	3(0.87%)	**18(2.73%)**
Combination of smoking +smokeless tobacco	25(7.96%)	3(0.87%)	**28(4.24%)**

Chi-square value = 10.347; p = 0.004 (significant)

Graph 7(a): Distribution of study population based on the type of tobacco used



Chi-square value = 10.347; p = 0.004 (significant)

Table 7(b) shows the distribution of study population based on the duration and frequency of smoking. Among the study population 573(81.4%) had no habit of smoking. Of those who had the habit of smoking, 96(14.6%) were smoking for more than 10 years of which 93(29.6%) were males and 3(0.9%) were females. 7(1.1%) were smoking for 6-10 years. 9(1.4%) smoke 2 tobaccos per day, 13(2%) smoke more than 4-5 tobaccos per day, 82(12.4%) smoke more than 10 tobaccos per day. There was a statistical significant difference between duration of smoking and frequency of smoking with gender.

(for smoking duration, Chi-square value = 151.526; p= 0.000, for frequency, Chi-square value = 151.788; p=0.000)

Table 7(c) shows distribution of study population based on the duration and frequency of alcohol consumption. Among the study population 561(85%) had no habit of alcohol consumption and all were males. 75(10.9%) were consuming for more than 10 years and 14(2.2%) were consuming for 6-10 years. 58(8.78%) consumed weekly, 28(4.24%) consumed daily and 13(2%) consumed alcohol once monthly. There was a statistical difference between duration and frequency of alcohol consumption with gender.

(for duration, Chi-square value=118.5; p= 0.000, for frequency, Chi-square value =118.5; p= 0.000)

Table 7(b): Distribution of study population based on the duration and frequency of smoking

Smoking		Male (n= 314)	Female (n=346)	Total (n=660)
Duration	**No smoking**	194(61.8%)	343(99.1%)	**573(81.4%)**
	1-5 years	20(6.2%)	0(0%)	**20(3.0%)**
	6-10 years	7(2.2%)	0(0%)	**7(1.1%)**
	> 10 years	93(29.6%)	3(0.9%)	**96(14.6%)**
Frequency	**No smoking**	194(61.8%)	343(99.1%)	**537(81.4%)**
	1/day	4(1.3%)	0(0.0%)	**4(0.6%)**
	2/day	9(2.9%)	0(0.0%)	**9(1.4%)**
	3/day	6(1.9%)	0(0.0%)	**6(0.9%)**
	4-5/day	13(2.5%)	0(0.0%)	**13(2.0%)**
	6-10/day	8(2.5%)	1(0.3%)	**9(1.4%)**
	>10/day	80(25.5%)	2(0.6%)	**82(12.4%)**

Duration : chi square = 151.526; p= 0.000

Frequency : chi square = 151.788; p=0.000

Table 7(c): Distribution of study population based on the duration and frequency of alcohol consumption:

Alcohol		**Male (n= 314)**	**Female (n=346)**	**Total (n=660)**
Duration	**No alcohol**	215(68.5%)	346(100%)	**561(85%)**
	1-5 years	13(4.1%)	0(0%)	**13(1.96%)**
	6-10 years	14(4.5%)	0(0%)	**14(2.2%)**
	> 10 years	75(22.9%)	0(0.9%)	**75(11.4%)**
Chi square value =118.5; p=0.000 (significant)				
Frequency	**No habits**	215(68.5%)	346(100%)	**561(85%)**
	Daily	28(8.9%)	0(0%)	**28(4.24%)**
	Weekly	58(18.5%)	0(0%)	**58(8.78%)**
	Monthly	13(4.1%)	0(0%)	**13(2%)**
	Yearly	0(0%)	0(0%)	**0(0%)**
Chi square value =118.5; p=0.000 (significant)				

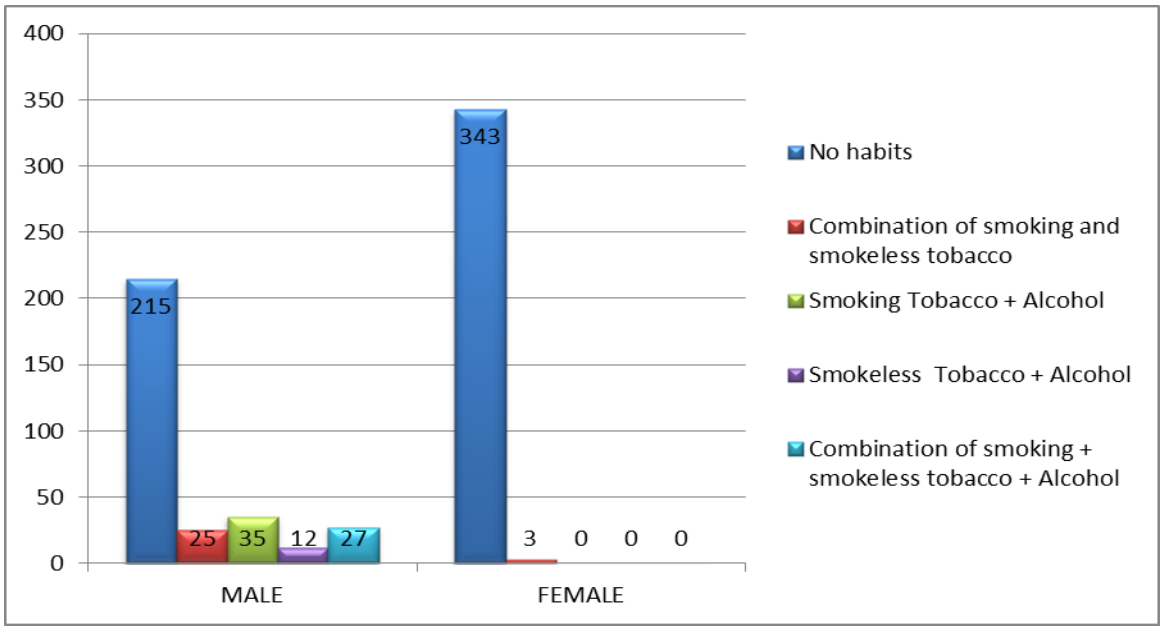
Table 7(d) shows distribution of study population based upon whether they have any habit of tobacco usage or alcohol consumption. Among the total study population 558(84.5%) had no habit of tobacco usage or alcohol consumption, of which 215 (68.5%) were males and 343(.99.13%) were females. 28(4.24%) had the habit of tobacco both smoking and smokeless form, of which 25(7.96%) were males and 3(0.87%) were females. 35(5.3%) males had the habit of smoking and alcohol consumption, 12(1.82%) males had the habit of tobacco chewing and alcohol consumption and 27(4.09%) males had the combination habit of smoking, tobacco chewing and alcohol consumption. Statistical tests showed a significant difference between tobacco and alcohol habits, and gender. (Chi-square value = 25.646; p=0.000)

Table 7(d): Distribution of study population based on alcohol and tobacco used

Habit	Male(n= 314)	Female(n=346)	Total (n=660)
No habits	215(68.5%)	343(100%)	**558(84.5%)**
Combination of smoking +smokeless tobacco	25(7.96%)	3(0.87%)	**28(4.24%)**
Smoking Tobacco + Alcohol	35(11.15%)	0(0%)	**35(5.30%)**
Smokeless Tobacco + Alcohol	12(3.82%)	0(0%)	**12(1.82%)**
Combination of smoking +smokeless tobacco + Alcohol	27(8.59%)	0(0%)	**27(4.09%)**

Chi-square value = 25.646; p = 0.000 (Significant)

Graph 7(d): Distribution of study population based on alcohol and tobacco used



Chi-square value = 25.646; p = 0.000 (Significant)

Table 8(a) shows the distribution of study population based on any symptoms in the Tempero-mandibular joint. 409(62%) of the study population had no symptoms in the joint of which 202(64.3%) were males and 207(59.8%) were females. 251(38%) of the study population had symptoms in the TMJ examination of which 112(35.7%) were males and 139(40.2%) were females. Statistically, there was no significant difference between TMJ symptoms and gender (Chi-square value = 1.417; p= 0.234)

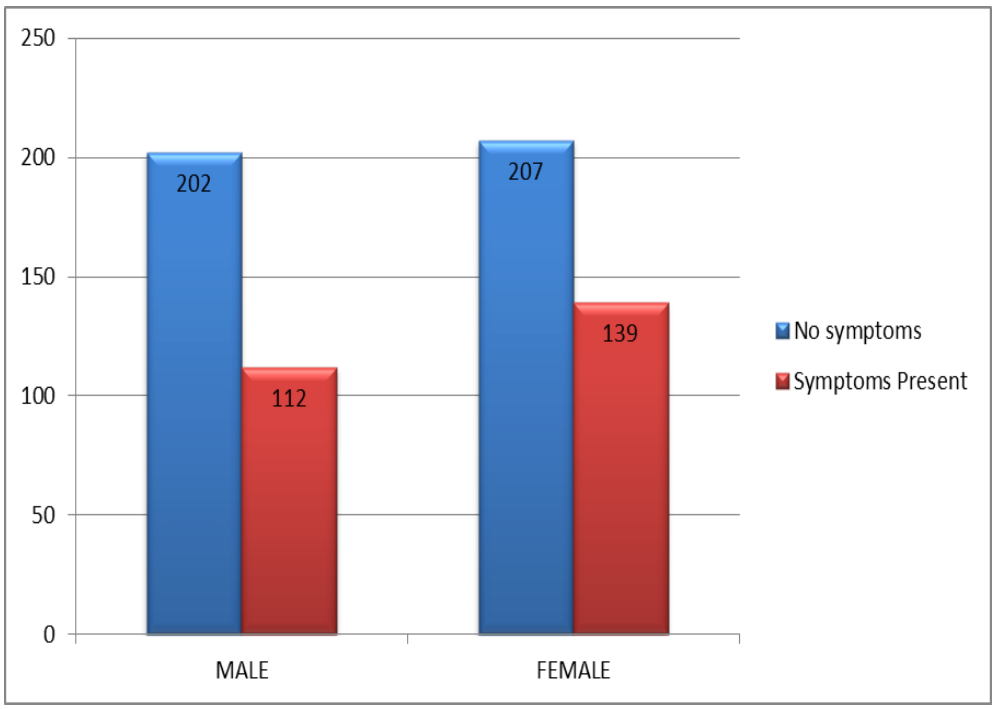
Table 8(b) shows distribution of study population based on the TMJ examination- signs. 249(37.7%) had clicking of TMJ, of which 112(35.7%) were males and 137(39.6%) were females. 123(18.6%) had tenderness on palpation of TMJ, of which 57(18.2%) were males and 66(19.1%) were females. Statistically, there was no significant difference between TMJ signs and gender (Chi-square value = 1.080; p=0.299)

Table 8(a): Distribution of study population based on the TMJ examination – symptoms

TMJ symptoms	Male (n= 314)	Female (n=346)	Total (n=660)
No symptom	202(64.3%)	207(59.8%)	**409(62%)**
Present	112(35.7%)	139(40.2%)	**251(38%)**

Chi-square value = 1.417; p= 0.234 (non significant)

Graph 8(a): Distribution of study population based on the TMJ examination- symptoms



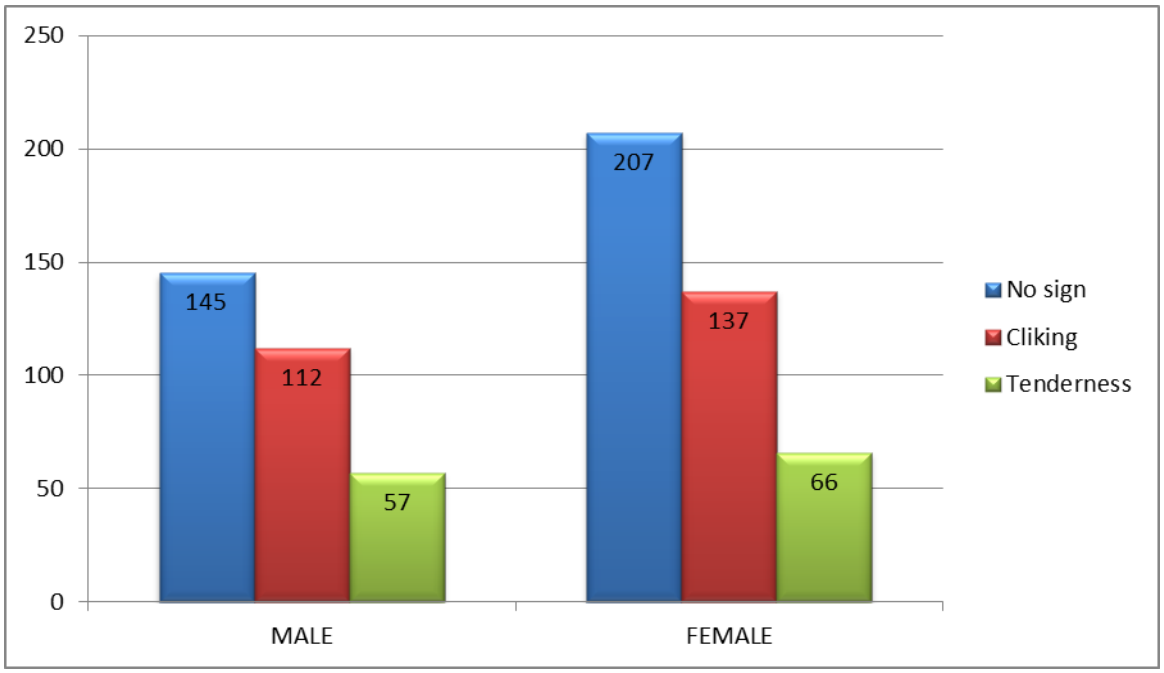
Chi-square value = 1.417; p= 0.234 (non significant)

Table 8(b): Distribution of study population based on the TMJ examination – signs

TMJ signs	Male (n=314)	Female(n=346)	Total(n=660)
No sign	145(46.18%)	203(58.67%)	**372(56.36%)**
Clicking	112(35.7%)	137(39.6%)	**249(37.7%)**
Tenderness	57(18.2%)	66(19.1%)	**123(18.6%)**

Chi-square value = 1.080; p=0.299(non significant)

Graph 8(b): Distribution of study population based on the TMJ examination- signs



Chi-square value = 1.080; p=0.299(non significant)

Table 9 shows the distribution of study population based upon the oral mucosal condition. Majority of the population, 432(65.45%) had no abnormal condition of oral mucosa, of which 183(58.28%) were males and 249(79.3%) were females. There were cases of 126 (19.09%) leukoplakia, of which 69(21.97%) were males and 57(16.47%) were females. 26(3.94%) ulcers, 33(5%) leukoplakia along with ulcers. 5 (0.76%) malignant tumors were present, of 3(0.96%) were males and 2(0.58%) were females. 38(5.76%) of the study populations had other abnormal conditions. Statistically, there existed a significant difference between oral mucosal condition and gender. (Chi square value = 84.97; p=0.000).

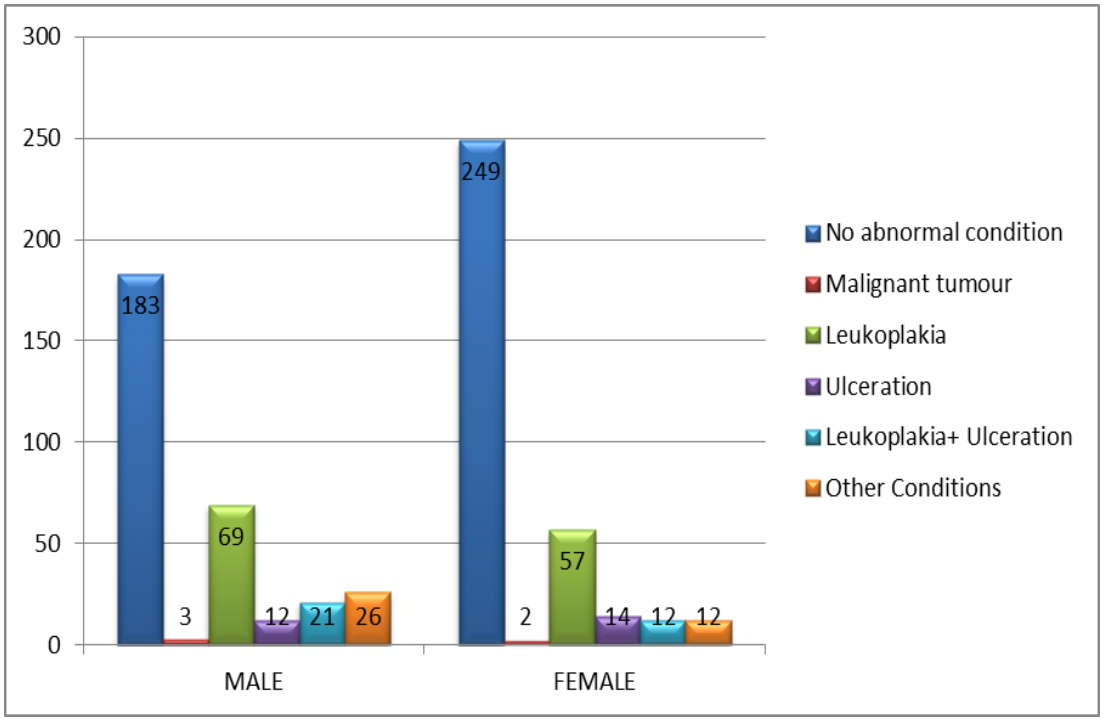
Table 9: Distribution of study population based on the

Oral mucosa condition

Oral mucosal condition	Male(n= 314)	Female(n=346)	Total (n=660)
No abnormal condition	183(58.28%)	249(79.3%)	**432(65.45%)**
Malignant tumor	3(0.96%)	2(0.58%)	**5(0.76%)**
Leukoplakia	69(21.97%)	57(16.47%)	**126(19.09%)**
Ulceration	12(3.82%)	14(4.05%)	**26(3.94%)**
Leukoplakia+ ulceration	21(6.69%)	12(3.47%)	**33(5%)**
Other conditions	26(8.28%)	12(3.47%)	**38(5.76%)**

Chi square value = 84.976; p=0.000 (significant)

Graph 9: Distribution of study population based on the Oral mucosa ondition



Chi square value = 84.976; p=0.000 (significant)

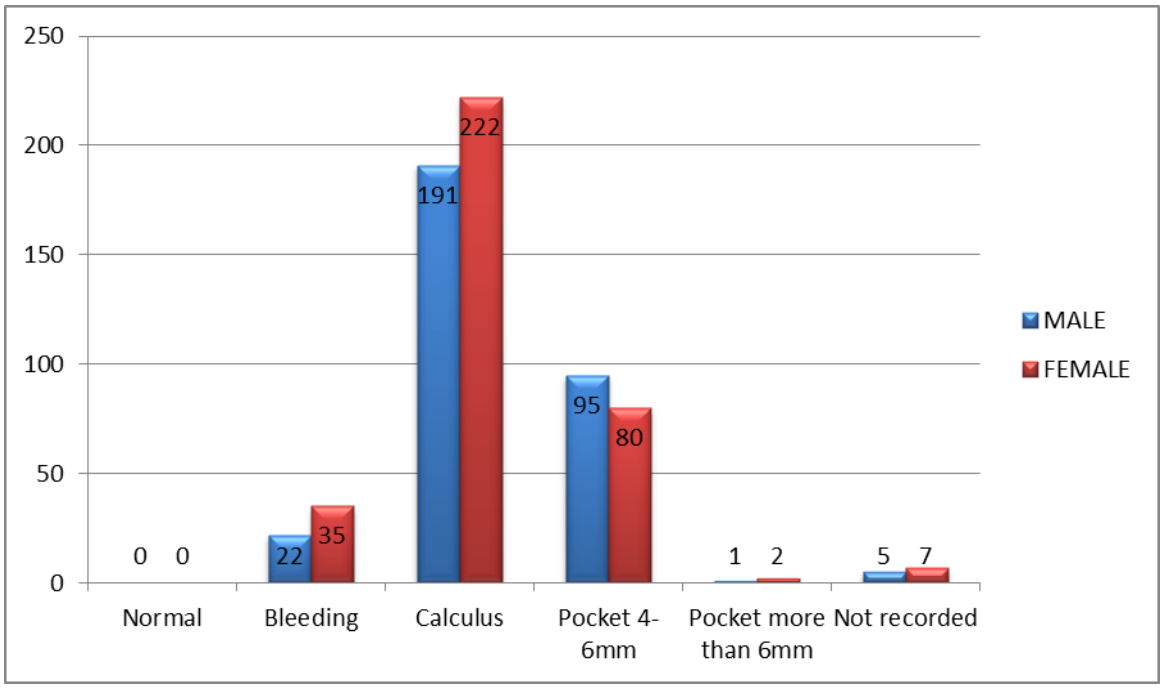
Table 10 shows distribution of study population based on CPI index. Among the total study population majority, 413(62.6%) had calculus, of which 191(60.8%) were males and 222(64.2%) were females. 175(26.5%) had pocket 4-5mm, of which 95(30.3%) were males and 80(23.1%) were females. 57(18.6%) had bleeding, 3(0.5%) had pocket 6mm or more, none (0%) were normal and 12(1.8%) were not recorded. Statistical tests showed a significant difference between CPI index and gender (Mann Whitney U = 8047; p=0.00)

Table 10: Distribution of study groups based on CPI index:

CPI	Male(n= 314)	Female(n=346)	Total(n=660)
0	0(0%)	0(0%)	**0(0%)**
1	22(7%)	35(10.1%)	**57(8.6%)**
2	191(60.8%)	222(64.2%)	**413(62.6%)**
3	95(30.3%)	80(23.1%)	**175(26.5%)**
4	1(0.3%)	2(0.6%)	**3(0.5%)**
9	5(1.6%)	7(2%)	**12(1.8%)**

Mann-Whitney U = 8047; p= 0.000 (significant)

Graph10: Distribution of study population based on CPI index



Mann-Whitney U = 8047; p= 0.000 (significant)

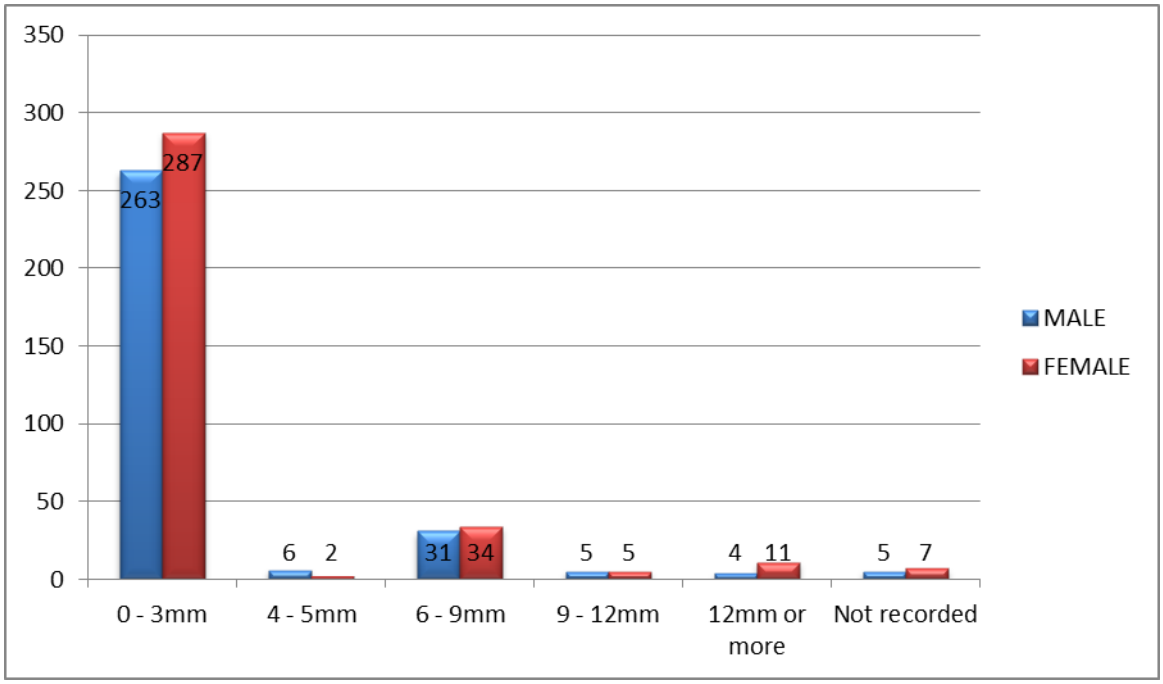
Table 11 shows distribution of study population based on LOA index and gender. Among the study population, 550(83.3%) had 0-3mm, of which 263(83.8%) were males and 287(82.9%) were females. 8(1.2%) had 4-5mm loss of attachment, of which 6(1.9%) were males and 2(0.6%) were females. 65(9.8%) had 6-8mm loss of attachment, of which 31(9.9%) were males and 34(9.8%) were females. 10(1.5%) had 9-11mm loss of attachment, 15(2.3%) had loss of attachment 12 mm or more and in 12(1.8%) loss of attachment was not recorded. Statistical test showed significant difference between loss of attachment and gender. (Mann Whitney U = 9860.5; p=0.000).

Table 11: Distribution of study groups based on LOA index:

LOA	Male(n= 314)	Female(n=346)	Total(n=660)
0	263(83.8%)	287(82.9%)	**550(83.3%)**
1	6(1.9%)	2(0.6%)	**8(1.2%)**
2	31(9.9%)	34(9.8%)	**65(9.8%)**
3	5(1.6%)	5(1.4%)	**10(1.5%)**
4	4(1.3%)	11(3.2%)	**15(2.3%)**
9	5(1.6%)	7(2%)	**12(1.8%)**

Mann-Whitney U = 9860.5; p = 0.000 (significant)

Graph 11: Distribution of study groups based on LOA index



Mann-Whitney U = 9860.5; p = 0.000 (significant)

Table 12 (a, b and c) shows distribution of study population based on their dentition status and treatment needs.

Table 12(a) shows 525(79.5%) had decayed crown, of which 259 (79.9%) were males and 275(79.5%) were females. 494(49.4%) had missing teeth, of which 136(43.3%) were males and 177(51.2%) were females. 3(0.5%) had filled crown, of which 2 were males and 1 was female. 12(1.8%) had abutment, of which 1 was male and 11 were females. 57(8.6%) had unerupted crown and 16(3.3%) had trauma.

12(a): Distribution of study population based on the Crown status

Crown status	Male (n= 314)	Female (n=346)	Total (n=660)
Decayed			
Yes	250(79.6%)	275(79.5%)	**525(79.5%)**
No	64(20.4%)	71(20.5%)	**135(20.5%)**
Missing			
Yes	136(43.3%)	177(51.2%)	**494(49.4%)**
No	178(56.7%)	169(48.8%)	**347(52.6%)**
Filled			
Yes	2(0.6%)	1(0.3%)	**3(0.5%)**
No	312(99.4%)	345(99.7%)	**657(99.5%)**
Abutment			
Yes	1(0.3%)	11(3.2%)	**12(1.8%)**
No	313(99.7%)	335(96.8%)	**648(98.2%)**
Unerupted crown			
Yes	23(7.3%)	34(9.8%)	**57(8.6%)**
No	291(92.7%)	312(90.2%)	**603(91.4%)**
Trauma			
Yes	14(4.5%)	8(2.5%)	**16(3.3%)**
No	300(95.5%)	338(97.5%)	**638(96.7%)**

Table 12(b) shows 245(37.1%) had decayed root, of which 107 (34.1%) were males and 138(39.88%) were females 14(2.1%) roots were exposed, of which 5(1.6%) were males and 9(2.6%) were females. 377(57%) root were not recorded, of which 167(53.2%) were males and 210(60.7%) were females. None of the roots were filled or filled without decay.

Table 12(c) shows 334(50.6%) needed one surface restoration, of which 145(46.7%) were males and 189(54.6%) were females. 67(10.2%) needed two surface restoration, of which 39(12.4%) were males and 28(8.1%) were females. 172(26.1%) needed pulp care, of which 92(29.3%) were males and 120(23.1%) were females, and 315(47.7%) needed extraction of which 140(44.6%) were males and 175(50.6%) were females.

Table 12 (b): Distribution of study population based on the root status:

Root status	Male (n=314)	Female (n=346)	Total (n=660)
Decayed			
Yes	107(34.1%)	138(39.88%)	**245(37.1%)**
No	207(65.9%)	208(60.12%)	**415(62.9%)**
Filled with decay/ filled without decay			
Yes	0(0%)	0(0%)	**0(0%)**
No	314(100%)	346(100%)	**660(100%)**
Root unexposed			
Yes	309(98.4%)	337(97.4%)	**646(97.9%)**
No	5(1.6%)	9(2.6%)	**14(2.1%)**
Root not recorded			
Yes	167(53.2%)	210(60.7%)	**377(57.1%)**
No	147(46.8%)	136(39.3%)	**283(42.9%)**

Table 12 (c): Distribution of study population based on treatment needs:

Treatment needs	Male (n=314)	Female (n=346)	Total (n=660)
One surface restoration			
Yes	145(46.7%)	189(54.6%)	**334(50.6%)**
No	169(53.3%)	157(45.4%)	**326(49.4%)**
Two surface restoration			
Yes	39(12.4%)	28(8.1%)	**67(10.2%)**
No	275(87.6%)	318(91.9%)	**393(89.8%)**
Pulp care			
Yes	92(29.3%)	120(23.1%)	**172(26.1%)**
No	222(70.7%)	226(76.9%)	**488(73.9%)**
Extraction			
Yes	140(44.6%)	175(50.6%)	**315(47.7%)**
No	174(55.4%)	171(49.4%)	**345(52.3%)**

Table 13 (a and b) shows distribution of study population based on their prosthetic status.

Table 13 (a) shows distribution of study population based on their prosthetic status in the upper arch. Among the total population none(0%) had full prosthesis. 7(2%) females had one unit prosthesis in the upper arch. 1(0.3%) male and 1(0.3%) female had multi-unit prosthesis. 312(99.4%) males and 338(97.9%) females had no prosthesis. Statistical test showed significant difference between prosthetic status and gender for upper arch, but there was no statistically significant difference for the lower arch and gender.

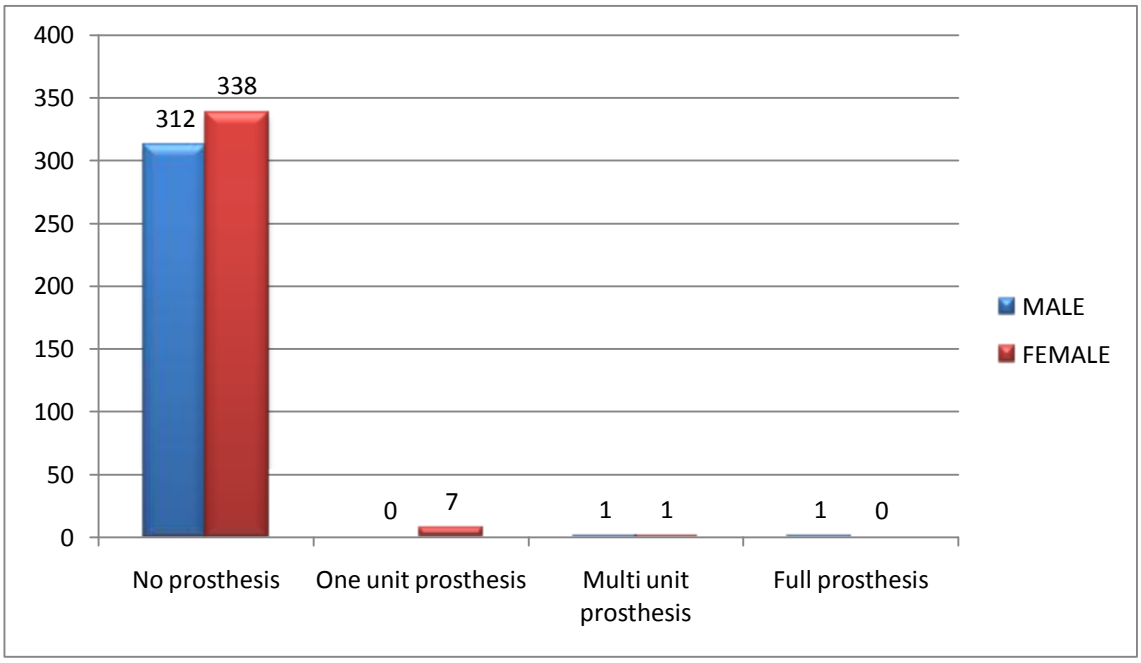
(Chi-square value for upper = 7.506; p=0.05)

Table 13 (a): Distribution of study groups based on upper prosthetic status:

Prosthetic status	**No prosthesis**	**One-unit prosthesis**	**Multiunit prosthesis**	**Full prosthesis**
Male	312(99.4%)	0(0%)	1(0.3%)	1(0.3%)
Female	338(97.9%)	7(2%)	1(0.3%)	0(0%)
Total	**650(98.5%)**	**7(1.1%)**	**2(0.3%)**	**1(0.2%)**

Chi-square value for upper = 7.506; p=0.05 (significant)

Graph 13 (a): Distribution of study groups based on the upper prosthetic status



Chi-square value for upper = 7.506; p=0.05 (significant)

Table 13 (b) shows distribution of study population based on their prosthetic status in the lower arch. Among the total population none (0%) had full prosthesis. 2(0.6%) females had one unit prosthesis in the upper arch. 1(0.3%) male and 1(0.3%) female had multi-unit prosthesis. 332(99.7%) males and 343(99.1%) females had no prosthesis. Statistical test showed significant difference between prosthetic status and gender for lower arch, but there was no statistically significant difference for the lower arch and gender.

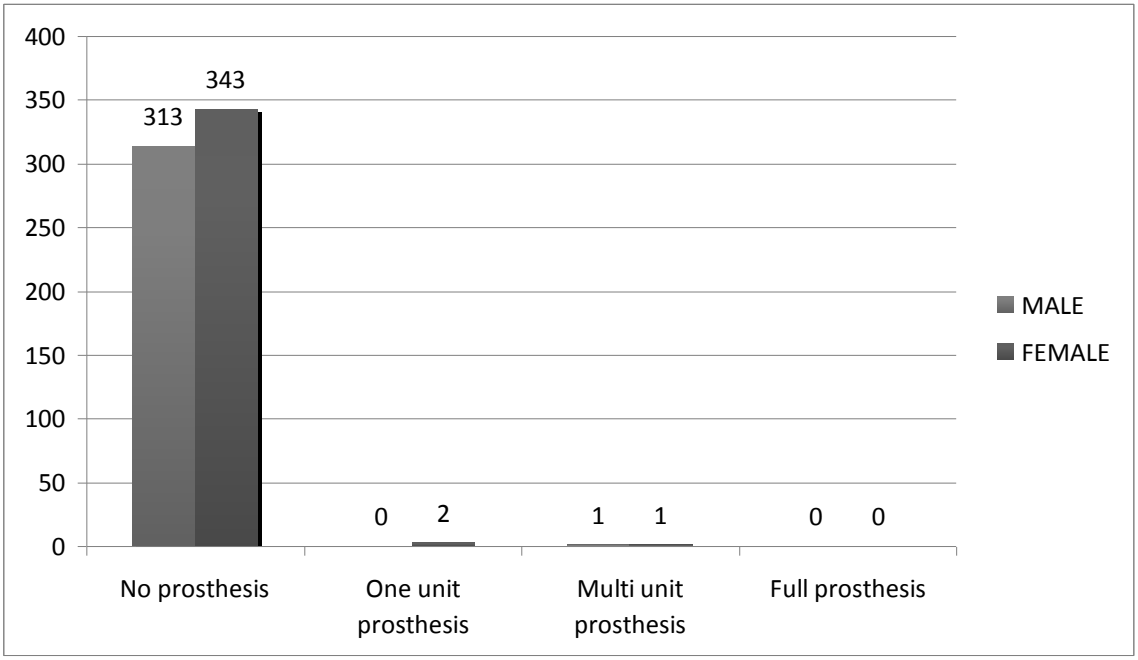
(Chi-square value for lower = 1.825; p=0.402)

Table 13(b): Distribution of study groups based on the lower prosthetic status:

Prosthetic status	No prosthesis	One-unit prosthesis	Multiunit prosthesis	Full prosthesis
Male	313(99.7%)	0(0%)	1(0.3%)	0(0%)
Female	343(99.1%)	2(0.6%)	1(0.3%)	0(0%)
Total	**656(99.4%)**	**2(0.3%)**	**2(0.3%)**	**0(0%)**

Chi-square value for lower = 1.825; p=0.402(non significant)

Graph 13 (b): Distribution of study groups based on the lower prosthetic status



Chi-square value for lower = 1.825; p=0.402(non significant)

Table 14(a and b) showed distribution of study population based on their prosthetic need.

Table 14(a) shows that among 660 study population, 85(12.9%) required multiunit prosthesis of which 41(13.1%) were males and 44(12.7%) were females. 80(12.1%) required one unit prosthesis of which 35(11.1%) were males and 45(13%) were females. 39(5.9%) required combination of one and multi-unit prosthesis of which 18(5.7%) were males and 21(6.1%) were females. 8(1.2%) required full prosthesis in upper arch of which 6(1.9%) females and 2(0.6%) males. Statistical tests showed a significant difference between prosthetic need in the upper arch and gender. (Chi-square value = 2.935; p=0.569)

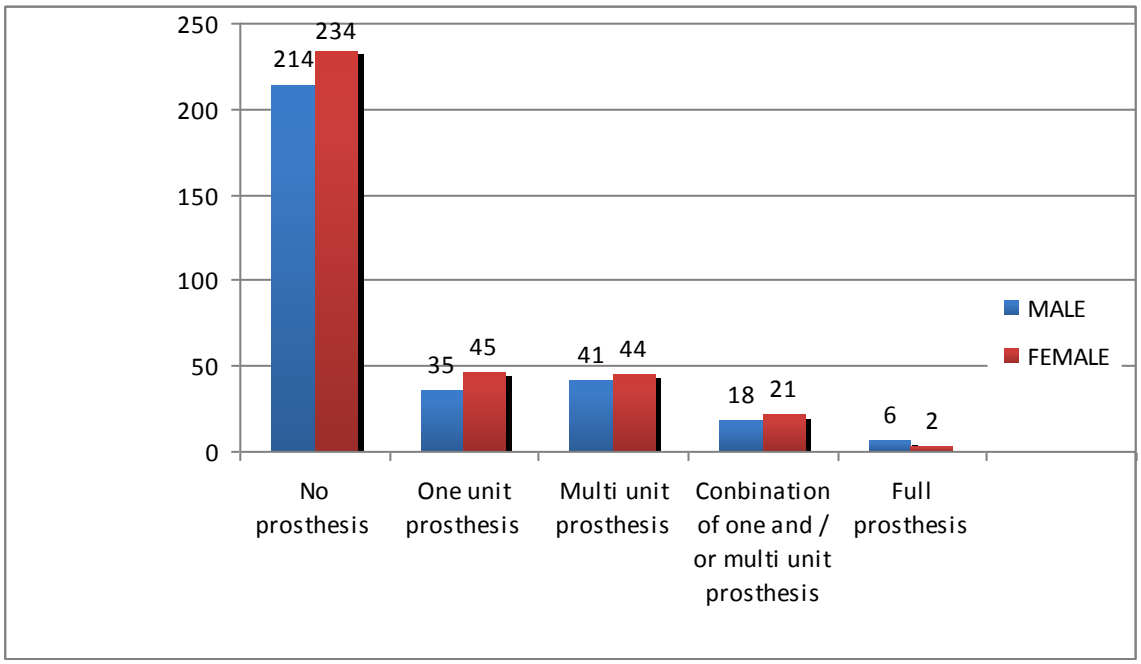
Table 14(b) shows that among the total population, 105(15.9%) required one unit prosthesis of which 44(14%) were males and 61(17.6%) were females. 88(13.3%) required multiunit prosthesis of which 37(11.8%) were males and 51(14.7%) were females. 39(5.9%) required combination prosthesis of which 16(5.1%) were males and 23(6.6%) were females. 6(0.9%) of which 2(0.6%)males and 4(1.2%)females required full prosthesis in lower arch. Statistical tests showed a significant difference between prosthetic need in lower arch and gender. (Chi-square value = 5.516; p=0.238)

Table 14(a): Distribution of study groups based on the prosthetic need in upper arch

Prosthetic need	No prosthesis	One-unit prosthesis	Multiunit prosthesis	Combination of one and/or Multiunit prosthesis	Full prosthesis
Male	214(68.2%)	35(11.1%)	41(13.1%)	18(5.7%)	6(1.9%)
Female	234(67.6%)	45(13%)	44(12.7%)	21(6.1%)	2(0.6%)
Total	**448(67.9%)**	**80(12.1%)**	**85(12.9%)**	**39(5.9%)**	**8(1.2%)**

Chi-square value = 2.935; p=0.569(non significant)

Graph 14(a): Distribution of study groups based on the prosthetic need in upper arch



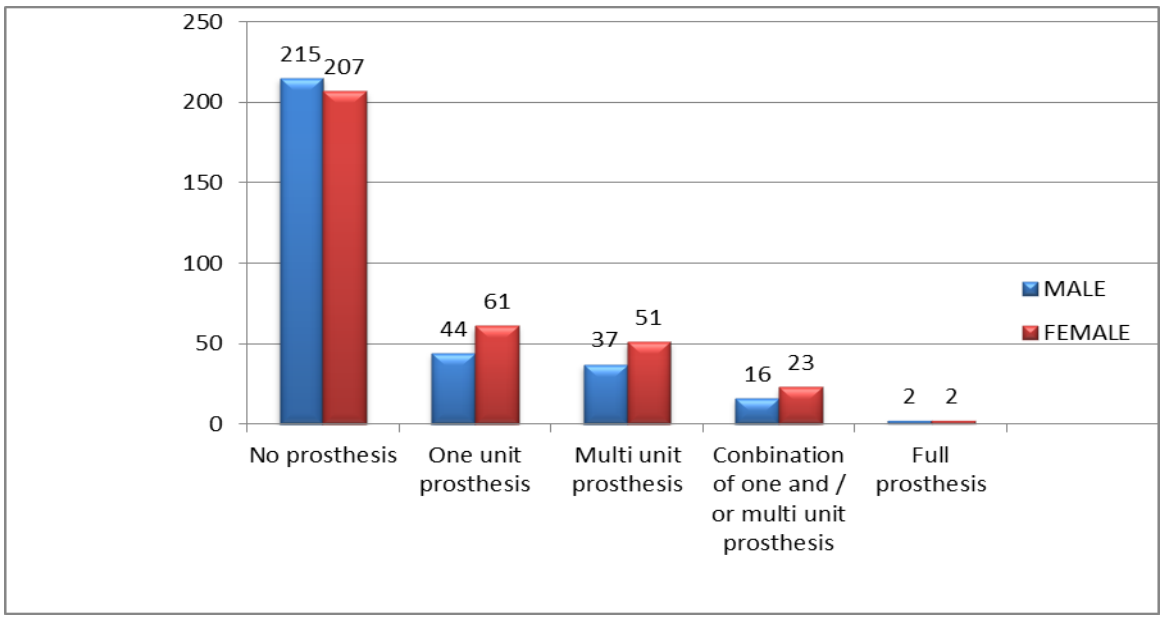
Chi-square value = 2.935; p=0.569(non significant)

Table 14(b): Distribution of study groups based on the prosthetic need in lower arch

Prosthetic need	No prosthesis	One-unit prosthesis	Multiunit prosthesis	Combination of one and/or Multiunit prosthesis	Full prosthesis
Male	215(68.5%)	44(14%)	37(11.8%)	16(5.1%)	2(0.6%)
Female	207(59.8%)	61(17.6%)	51(14.7%)	23(6.6%)	4(1.2%)
Total	**422(63.9%)**	**105(15.9%)**	**88(13.3%)**	**39(5.9%)**	**6(0.9%)**

Chi-square value = 5.516; p=0.238(non significant)

Graph 14 (b): Distribution of study groups based on the prosthetic need in lower arch



Chi-square value = 5.516; p=0.238(non significant)

Table 15 shows the study population based on DMFT mean and standard deviation. The mean and standard deviation were 5.78 and 5.506 for Males, and 6.03 and 5.030 for Females respectively.

Table 15: Distribution of study population based on Mean DMFT:

Gender	**Male**	**Female**
Mean	**5.78**	**6.03**
Standard deviation	**5.506**	**5.030**

Table 16, shows the distribution of study population based on material used for brushing and CPI. (0%)none had a normal gingiva, 325(78.7%) of the charcoal users had calculus, periodontal pocket depth of 4-6mm was common among 69(39.43%) of tooth powder with finger user and 65(37.1%) of charcoal users, periodontal pocket depth of more than 6mm was found in 1(33.3%) neem stick and 2(66.7%) charcoal users. Statistical tests showed a significant association between material used for brushing and CPI score.

Chi square value = 0.182; p=0.000 (significant)

Table 16: Distribution of study population based on material used for brushing and CPI:

Materials used	Normal	Bleeding	Calculus	Pocket 4-6mm	Pocket more than 6mm	Not recorded
Tooth paste+ tooth brush	0 (0%)	24 (42.1%)	22 (5.33%)	17 (9.71%)	0(0%)	0(0%)
Tooth powder+ tooth brush	0 (0%)	22 (38.6%)	3 (0.73%)	2 (1.14%)	0(0%)	0(0%)
Tooth paste + finger	0 (0%)	3 (5.26%)	26 (6.3%)	7 (4%)	0(0%)	4 (33.33%)
Tooth powder + finger	0 (0%)	3 (5.26%)	26 (6.3%)	69 (39.43%)	0(0%)	6 (50%)
Neem stick	0 (0%)	2 (.5%)	3 (0.73%)	6 (3.43%)	1 (33.3%)	0(0%)
Charcoal	0 (0%)	3 (5.26%)	325 (78.7%)	65 (37.1%)	2 (66.7%)	2 (16.7%)
Brick powder	0 (0%)	0(0%)	8 (1.94%)	9 (5.14%)	0(0%)	0(0%)
Total	**0**	**57**	**413**	**175**	**3**	**12**

Chi square = 0.182; p=0.000 (significant)

Table 17 shows the distribution of study population based on the belief that extraction of upper tooth leads to blindness and need for extraction. Of those who believed that extraction of upper tooth leads to blindness, 293 (68.3%) required extraction of one or more teeth and of those who did not believe that extraction of upper tooth leads to blindness, 22(9.5%) required extraction of one or more teeth. Statistical tests showed a significant association between the beliefs that extraction of upper tooth leads to blindness and need for extraction. F = 7.896; p = .005 (significant)

Table 17: Distribution of study population based on the belief that extraction of upper tooth leads to blindness and need for extraction:

	Belief - Yes	**Belief – No**
Requiring Extraction	293 (68.3%)	22 (9.5%)
Not requiring Extraction	136 (31.7%)	209 (90.5%)
Total	**429** **(65%)**	**231** **(35%)**

F = 7.896; p = .005 (significant)

Table 18 shows the distribution of study population based on the belief that extraction of a single tooth loosens others too and need for extraction. Of those who believed that extraction of a single tooth loosens others too and need for extraction 297 (63.2%) required extraction of one or more teeth and of those who did not believe that extraction of a single tooth loosens others too and need for extraction 18(9.57%) required extraction of one or more teeth. Statistical tests showed a significant association between the belief that extraction of a single tooth loosens others too and need for extraction. F = 7.554; p = .006 (significant)

Table 18: Distribution of study population based on the belief that extraction of a single tooth loosens others too and need for extraction

	Belief - Yes	**Belief – No**
Requiring Extraction	297 (63.2%)	18 (9.47%)
Not requiring Extraction	173 (36.8%)	172 (90.13%)
Total	**470** **(65%)**	**190** **(35%)**

F = 7.554; p = .006 (significant)

DISCUSSION

The present study was a cross-sectional study carried out to assess the oral health status and treatment needs of the Malayali tribes of Yelagiri hills in Vellore district, Tamilnadu among 660 Malayali tribes. In this study the WHO Oral Health Assessment Proforma (basic oral health survey 1997) and a pretested closed ended structured questionnaire were used.

Male to female ratio was with 314 (47.58%) Males and 346 (52.42%) Females, from 12 different villages of the Yelagiri hills were involved.

DENTAL BELIEFS:

Of the total population 660, 456(69.1%) believed that spacing in the front teeth brings good luck to them, 444(67.3%) believed that cleaning with salt whitens teeth, 571(86.5%) believed that using clove kills germ, 624(94.5%) believed that burying milk teeth helps permanent teeth to grow properly, 547(82.9%) refused to undergo treatment on Tuesdays and Fridays, 535(81.1%) refused to undergo dental treatment in the evening, 429(65%) believed that the extraction of upper tooth leads to blindness, 470(71.2%) believed that extraction of single tooth loosens other also, 508(77%) believed that dental treatment was always painful. The deep rooted beliefs, preservation of natural tooth, poor education, and maintenance of traditional values and lack of awareness were the reasons for these attitudes of the people. This was similar to the study done by **Kumar ST et al (2006)**[19] on the Bhil tribes of Rajasthan, where the tribal population believed decayed tooth extraction leads to blindness.

DENTAL VISITS AMONG STUDY POPULATION

Of the total study population, 228(34.5%) had never visited dentist. Of those visited, majority 409(62%) had visited dentist due to tooth ache, 1(0.2%) had visited for filling the teeth, 4(0.6%) visited dentist for cleaning their teeth and 10(1.5%) had visited dentist for dentures. The reason for not visiting dentist may be due to practice of traditional medication, low priority to dental health and people visited dentists only at the severe stage due to lack of awareness on dental health and preservation of natural teeth.

All these factors were similar with the previous study conducted by **Kadir RA, Yassin AT. (1989)**[11], among the Aborigines of the Selangor Orang Asli, where 61% aborigines adults had experienced toothache and 28% had bleeding gums. Of those only 1.2% went to see the dentist, the rest treated through traditional or conservative methods.

Hamasha A et al. (2000)[26] conducted a study on rural Jordanian adults and stated that people gave dental health a low priority in their lives, especially for the more expensive dental treatment, thus extraction of teeth was the most common treatment modality among the people.

TOBACCO HABITS AND ALCOHOL CONSUMPTION

The present study showed that among the study population 99(15%) had the habit of alcohol consumption. Of those who had the habit of smoking, 72(10.9%) smoked beedi, 7(1.06%) smoked cigarette, 65(9.85%) chewed raw tobacco chewing, 18(2.73%) chewed Hans and 28(4.24%) had a combination of smoking and smokeless tobacco usage. The reason for practicing these habits were as a measure to combat the cold, relieving stress and body pain after work, and the lack of awareness of the hazards of the materials used.

This was similar to the study done **Kumar ST et al (2006)[19]** on the Bhil tribes of Rajasthan, where smoking beedis, chillum and chewing tobacco and paan along with consumption of alcohol was prevalent.

ORAL HYGIENE PRACTICES

It was observed in the present study all had the habit of brushing their teeth and majority 637(79%) brushed their teeth once daily. In considering the material used for cleaning, Charcoal 397(60.2%) was predominantly used, followed by 104(15.8%) tooth powder, 12(1.8%) neem stick and 17(2.6%) brick powder. Only 63(9.5%) used tooth paste and tooth brush. The lack of awareness in maintaining oral health and less importance to tooth as a part of the body could be the probable reason. This finding was similar to the study done by **Kumar ST et al (2006)[19]** on the Bhil tribes of Rajasthan, where once daily brushing with indigenous methods using rattan jot (Jatropha curcas and Jatropha gossipifolia) and twigs of Jhatbor

(Ziziphus nummularia) were followed. A mouthwash made from boiled chilbaitha fruit, and clove oil to relieve toothache was used.

Kumar A, Virdi M, Veeresha KL, Bansai V (2010)[25] conducted a cross-sectional descriptive study in 12 villages of Ambala district, Haryana where 12.3% used tree stick, 2.7% did not use any brushing aid and 4.9% never or rarely brushed their teeth.

Another study done by **Jamieson LM, Roberts-Thompson KF, Sayers SM (2010)[24]** among a birth cohort of Australian Aboriginal young adults also reported the non- ownership of tooth brushes and use of indigenous tooth cleaning habits among those population.

ORAL MUCOSAL LESIONS

In the present study, the percentage of oral mucosal lesions observed were as follows: 126(19.09%) leukoplakia, 26(3.94%) ulceration and 5(0.76%) malignant tumor. 38(5.76%) of the study populations had other abnormal conditions like candidiasis and OSMF. Prevalence of oral mucosal lesions in the study population was due to tobacco usage and alcohol consumption and lack of awareness regarding the deleterious effects of the products used. This was in agreement with the previous study done by **Deshmukh P, Raizade R, Chaturvedi V (1995)[27]** in rural inhabitants of Maharashtra, India which showed that the prevalence of leukoplakia lesions was highest (6.06/1000) among people with tobacco usage and alcohol consumption.

Similarly, **Salonen L et al. (1990)**[12] reported on occurrence of oral mucosal lesions and the influence of tobacco habits in a randomly selected adult Swedish population. Nine hundred twenty (920, 95%) of the selected samples of 967 subjects were examined and lesions were registered in 596. The relationship between tobacco habits and mucosal lesions was analysed and a positive correlation was demonstrated between tobacco use and leukoplakia.

Kumar A, Virdi M, Veeresha KL, Bansai V (2010)[25] conducted a cross-sectional descriptive study in 12 villages of Ambala district, Haryana, India to assess the oral health status and treatment needs among rural population of Ambala on 1250 subjects and found the prevalence of oro-mucosal lesions was 15%, with 80% being leukoplakia. Smokers had a higher prevalence 16% of leukoplakia.

PERIODONTAL DISEASE:

The present study showed that majority 413(62.6%) had calculus, 175(26.5%) had pocket 4-5mm, 57(18.6%) had bleeding, 3(0.5%) had pocket 6mm or more. Universally the oral hygiene was poor with widespread hard and soft deposits evident. The etiology and pathogenesis of periodontal disease involves a complicated interplay between the plaque etiological agents and various risk factors. However, in the present study the increase in prevalence of periodontal disease might be due to lack of proper oral hygiene practices, tobacco habits, lack of awareness about oral health and probably indigenous brushing

habits. The results in our present study were similar with the study done by **Nawell PL (2002)[14]** among a rural highland community in New South Wales, Australia showed that 70% had dental calculus and required calculus removal and concluded that progressive periodontal disease was common and increased in prevalence and severity with age.

Dowsett SA, Archila L, Segreto VA, Eckert GJ, Kowolik MJ (2001)[13] conducted a study on 239 subjects of an indigenous Indian community of rural Central America (San Juan La Laguna, Guatemala) by a full-mouth periodontal examination on all existing teeth and found a high prevalence of pocketing. 90% of adults more than 35 years had at least one site with Clinical attachment loss more than 6 mm. Also the mean CAL increased with age.

Chu YH, Tatakis DN, Wee AG (2010)[28] conducted a study to determine the periodontal health of rural male population with smokeless tobacco habit and found a higher percentage of the study population with poor oral hygiene and increased attachment loss inspite of regular oral hygiene practices.

DENTAL CARIES:

Prevalence of dental caries:

Among the study population dental caries prevalence was 79.5%. This increase might be due to poor oral hygiene practices like using finger for brushing teeth, using indigenous materials like neem, charcoal, brick etc for tooth brushing.

The findings were in agreement with the previous study conducted in Varanasi by **Kapoor AK et al (1980)[29]** found that the prevalence of dental caries was more (82.48%) among people with poor oral hygiene practices than with good oral hygiene practices. The reason might be due to poor oral hygiene practices (especially cleaning with finger), which led to insufficient cleaning of proximal surface and pit and fissures in the teeth.

Mean DMFT:

The mean DMFT in the present study was 5.78 ± 5.030 teeth. Similar high values are found in a study conducted by **Bhat M (2008)[22]** on 1000 samples (599 males and 401 females) to assess the oral health status and treatment needs of a rural Indian fishing community using convenient sampling and found 78% of the subjects were affected by dental decay, the mean DMFT score was found to reach 9.91.

Another study that supports this observation was conducted by **Jamieson L, Armfield JM, Roberts-Thomson KF (2006)[20]** among indigenous and non-indigenous children in the northern territory of Australia. In that study across all age groups higher mean dmft and DMFT were experienced by indigenous children than non-indigenous group. Indigenous children had almost 3times dmft and 2.3times DMFT than non-indigenous children respectively.

Kasim BA, Noor MA, Chindia ML (2006)[21] conducted a cross-sectional descriptive study on oral health status among 141 kenyans in a rural arid setting to determine the dental caries experience and the results showed 56.7% of the

subjects were caries free and a higher caries prevalence among illiterates. Mean DMFT for all ages was 3.4.

DENTITION STATUS:

It was observed from the present study that 525(79.5%) had decayed crown, 494(49.4%) had missing teeth, 3(0.5%) had filled crown, 12(1.8%) had abutment, 57(8.6%) had unerupted crown and 16(3.3%) had trauma. 245(37.1%) had decayed root, 14(2.1%) roots were exposed and 377(57%) root were not recorded. 334(50.6%) needed one surface restoration, 67(10.2%) needed two surface restoration, 172(26.1%) needed pulp care and 315(47.7%) needed extraction. The high figures for untreated dental decay and for missing teeth indicate less frequent visit to dentist, lack of practicing dentist in their locality, even if dentists are available the cost of treatment is too high for them to afford, lack of awareness in maintaining oral hygiene. Many (83.5%) considered teeth as one that falls off and it's a waste to spent money on it. They think even early loss of teeth is a normal phenomenon.

Root surface caries are mainly seen as a consequence of poor oral hygiene, chronic periodontal disease with gum recession and exposure of the softer more susceptible root surfaces to the oral environment. The decay usually progresses slowly and painlessly and was not noticed by the sufferer because they usually are filled with food debris and located at or below the gingival margin.

This was similar to the study done by **Nawell PL (2002)**[15] among a rural highland community in New South Wales, Australia, where 60% of the total sample were affected by dental and root caries. The reason for untreated dental decay given was poor access to dentist, even if dentists are available the cost of treatment is too high for them to afford.

TREATMENT NEEDS:

The present study showed 334(50.6%) needed one surface restoration, 315(47.7%) needed extraction, 67(10.2%) needed two surface restoration and 172(26.1%) needed pulp care. The reason for the accumulated treatment needs may be due to their beliefs about the dental treatment, lack of awareness, least importance to tooth and lack of dentist nearby. This was similar to the study conducted by **Kumar ST et al (2006)**[19] on the Bhil tribes of Rajasthan, where Extraction was the most required treatment followed by one surface filling. Very few teeth in the younger age groups were indicated for extraction; however a mean of 6.52 teeth requiring extraction was recorded in the 45-54 year old age group. Two surface fillings were the lowest needed treatment when compared to the other needs.

According to the study done by **Nawell PL (2002)**[15] among a rural highland community in New South Wales, Australia, 60% of the total sample needed restoration of teeth and 36% needed extractions of teeth.

PROSTHETIC STATUS AND TREATMENT NEEDS:

The present study showed 494(49.4%) had one or more missing teeth in the upper and lower arch. Of which 8(1.2%) needed complete denture in upper arch and 6(0.9%) needed full removable denture in lower arch. This was due to early loss of teeth and lack of awareness about the need to replace their lost teeth timely.

A study conducted by **Doughan B, Kassak K, and Bourgois DM(2000)**[30] among Lebanese adults was in agreement with the present study which can be concluded that due to lack of awareness to replace the lost tooth, the study subjects were in greater need of prosthesis.

TOOTH SURFACE LOSS:

In the present study 253(38.33%) had generalized attrition, 132(20%) had generalized attrition and abrasion. This might be due to practice of indigenous methods of brushing teeth using indigenous methods like charcoal, neem stick, brick powder etc. This was similar to the findings from the study done by **Kumar ST et al (2006)**[19] on the Bhil tribes of Rajasthan and **Deshmukh P, Raizade R, Chaturvedi V (1995)**[27] in rural inhabitants of Maharashtra.

SUMMARY

The present descriptive cross-sectional study was conducted to assess the oral health status and treatment needs of Malayali tribes in Yelagiri hills, Vellore District, Tamil Nadu. Before beginning of the study ethical clearance was obtained from the Institution Review Board of Ragas Dental College & Hospital and also from the village administrative officer, Vellore district to conduct the study.

All the twelve villages of the Yelagiri hills were included in the study. Permanent inhabitants of the villages, who were present on the day of examination and willing to participate in the study were examined. Inhabitants with history of any systemic illness were excluded. Data was collected using proforma which consisted of WHO basic oral health assessment form (1997) and a pre-tested, closed ended questionnaire. The collected data was subjected to statistical analysis.

The findings of the current study were as follows:

- Of the study population 660, 314 (47.58%) were males and 346 (52.42%) were females.
- Among 660, majority 381(57.7%) have no formal education, 162(24.5%) have primary education, 72(10.9%) have secondary education, 22 (3.3%) have higher secondary education and 23(3.5%) hold a degree.
- Majority 409(62%) had visited dentist due to tooth ache, and 228(34.5%) have never visited dentist.

- Majority of the population 637(79%) brushed their teeth once a day and about 23(3.5%) of the population brushed their teeth twice daily.
- Majority 397(60.2%) used charcoal for brushing their teeth, followed by 104(15.8%) used tooth powder and finger, 12(1.8%) used neem stick, 17(2.6%) used brick powder to clean their tooth.
- 470(71.21%) of the study population had no tobacco habits and 561(85%) had no habit of alcohol consumption.
- On TMJ examination, 249(37.7%) had clicking, 123(18.6%) had tenderness on palpation.
- 126 (19.09%) had leukoplakia, 26 (3.94%) had ulceration and 5(0.76%) had malignant tumor in the study population.
- 413(62.6%) had dental calculus, 175(26.5%) had periodontal pocket 4-5mm, 3(0.5%) had periodontal pocket more than 6mm.
- 525(79.5%) had decayed crown, 494(49.4%) had missing teeth, 3(0.5%) had filled crown, 12(1.8%) had abutment.
- 245(37.1%) had decayed root, 14(2.1%) roots were exposed.
- 334(50.6%) needed one surface restoration, 67(10.2%) needed two surface restoration, 172(26.1%) needed pulp care and 315(47.7%) needed extraction.
- 85(12.9%) required multiunit prosthesis, 80(12.1%) required one unit prosthesis in the upper arch and 105(15.9%) required one unit prosthesis, 88(13.3%) required multiunit prosthesis in the lower arch.
- Majority, 587(88.9%) had pain or infection and were referred.

CONCLUSION

A total of 660 Malayali tribes were examined to assess the oral health status and treatment needs in Yelagiri hills, Tamil Nadu. From the results of this study it may be concluded that the Malayali tribes were characterized by a lack of awareness about oral health, deep rooted dental beliefs, high prevalence of periodontal with high caries prevalence, lack of previous dental care, high treatment needs, and limited access to oral health services. Oral health is an important part of everyone's well-being. It is a neglected issue in the case of Malayali tribes. The findings, however limited, may also bring to the light the magnitude of the oral health problem that exists among the tribal people. They are in definite need of oral health care.

Recommendations:

1. Periodic oral examination by dental professionals may help to control oral disease among these Malayali tribes.
2. Further studies may throw more light in this field to gain a more detailed understanding of oral health needs of Malayali tribes of Yelagiri hills.

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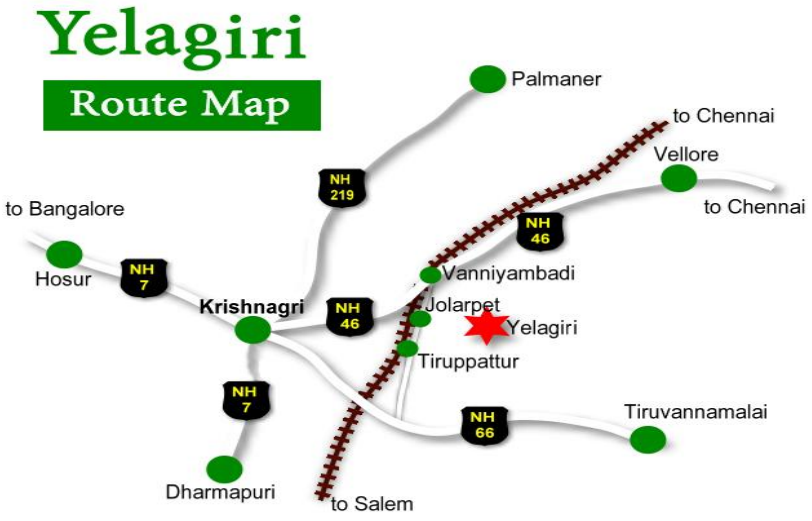
ANNEXURE: 1

TAMILNADU MAP

YELAGIRI ROUTE MAP



ANNEXURE : 2

MALAYALI TRIBES OF YELLAGIRI HILLS

– AN OVERVIEW[10]

Yelagiri is a serene and uncharted hill station in Tamil Nadu, situated halfway between Chennai and Bangalore positioned at an elevation of 920m above sea level. It is a huddle of 14 small villages, which extends over four hills in the Jawadh Hill ranges of the Eastern Ghats in Vellore District. The people "Malayalis " who live here are constitutionally categorized as tribe in Tamil Nadu. It is observed that this community had undergone a lot of changes since 1960s as a result of acculturation, which are reflected in the family structure, marriage systems, juridical conventions, dress code, life style, religious practices, rituals, health care and community customs. The contingent cultural features that originally differentiated them from those of the mainstream have impaired considerably as in various institutional respects, they draw closer to the mainstream today. Their customs, habits, and the structure of their houses are unique. Their lifestyles are different. The healthcare services they have are inadequate. Health care in the Malayali tribes is sought from various types of health care providers. Allopathic doctors, traditional medicine men, herbalists and dais (trained birth attendants) are the major providers available. Few people have access to a dentist.

MALAYALI TRIBES:

As per the 2011 Census 7,21,389 (1 per cent) are Scheduled Tribes (STs). Thirty six STs have been notified in Tamil Nadu by the Scheduled Castes and Scheduled Tribes Order (Amendment) Act, 1976. Malayali have been notified in Dharmapuri, Vellore, Tiruvannamalai, Pudukkottai, Salem, Namakkal, Villupuram, Cuddalore, Tiruchirappalli, Karur and Perambalur districts.

Malayali are the largest ST with a population of 3,53,480 constituting 47.6 per cent of the state ST population and the growth rate accounts to 24.2 per cent. "Malai" means the hill and "ali" mean the rulers. They presume themselves to be the rulers of their land. The history and the sangam literatures as well as the myths prevailing among Malaiyalis refer them as the successor of the migrants from kalvarayan hills with tamil as their mother tongue. The period prior to Malaiyalis probably could have been characterized by pristine ecosystems in which the Vedars who were essentially hunter-gatherers lived. The invasion and the settlement of Malaiyalis is a crucial point in the ecological history of Yelagiri hills. Malaiyalis brought agriculture to Yellagiri, which led to periodic manipulation with partial domestication of resources.

During 1960s a major intervention made a substantial impact in the social life by a France Christian Missionary, Father.Francis Guezou SDB, founder of the Bosco Institute of Technology, Yelagiri hills by the introduction of full-fledged road and transport system, education and housing.

Expectedly Malayali have the highest (98.3 per cent) rural population. The overall sex ratio is 980 females per 1000 males. Out of total workers, 'agricultural labourers' constitute 37.8 percent, 'Cultivators' account for 36.3 percent and only 23.6 percent has been returned as 'other workers'. Remaining 2.4 percent have been workers in 'household industry'. Majority of the Malayali population are Hindus (99.2 per cent). There are only 3,497 (0.5 per cent) Christians and 453 (0.1 per cent) Muslims.

SOCIO ECONOMIC CONDITIONS:

1. Housing – The people reside in thatched huts in their close to their agricultural land and donot live in groups.

2. Dowry system is practiced in this community and child marriage is not practiced among them, and they were getting marriage at the age of 17-19 years.

3. Delivery conducted by midwifery. Child mortality ratio is very high.

4. Basic infrastructure facilities like water, road and electricity are available in their areas.

TYPES OF DISEASES AND TREATMENTS BY MALAYALIS:

1. The Malayalis have their own traditional medical system. This traditional medical system is embedded in their concept of magico – religious and herbal medicine as a part of their culture. Magico – religious method broadly covers the aspects of controlling the sprits and dissatisfied souls.

2. The indigenous ethno medical practices of the Malayalis have a direct bearing on their food and other activites, particularly dependence on forests, and ecological conditions in which they live. Most of the medicines prepared by the Malayalis ethnic herbals are the extracts and mixtures of roots, barks, leaves, fruits, plants and herbs found in the surrounding area. They consider that every tree in the forest has its own value, and most of the trees / herbs are of medical importance. However the ethnic healers guard the names and identities of these plants as a secret, and this knowledge is transmitted only to those who are interested to learn. Malayalis believe that some plants have divine and magical powers as certain deities dwell in them.

3. They have their own traditional methods and techniques of dental care. For example, many use neem and bamboo twigs as toothbrushes. A mixture of charcoal, wheat and brick powder to clean the teeth. They believe that application of latex of tuar (Euphorbia neriifolia) with cotton makes loose teeth strong. Other interesting techniques include application of clove oil and magical rings to relieve toothache.

CAUSES OF ILLHEALTH:

1. The tribals have a different idea about health and sanitation. Their idea about food is limited to subsistence for they do not understand what nutrition is.

2. They do not care for individual health and similarly do not understand the effect of disease on their body. Malnutrition is one of the major public health problems in these areas.

3. Consumption of tobacco is common in this population. Smoking prevalent among males and Chewing raw tobacco as an ailment for toothache is common among the females. Alcohol consumption becomes predominant.

4. The tribals do not take adequate care of themselves or of their children when they are ailing.

5. The tribals do believe in local priests or medicine men or midwifery.

6. Most of the tribal families have their morning diet which consists of rice and maize, and a few other millets. Others go without morning diet. In the afternoon usually the people take rice, Sag and maize and the same items are also consumed in the night meal.

7. The pregnant tribal women have no special diet; hence they take the ordinary food like other family members.

8. There is no pre-natal and post-natal care by the Community health worker of health department. Therefore infant mortality rate is very high.

9. Most of the health problems in the tribal areas originate from poor nutrition, lack of safe drinking water, poor environmental sanitation. Superstitions and social injustices.

HEALTH MEASURERS:

1. There is one Primary health centre and three Health Sub-Centers functioning in the different villages. The Block Medical Officer is in charge of the Sub-Centers and attends each sub-centre twice a week.

2. To create better sanitary conditions in tribal areas it seems that T.W. C.D.P. (Tribal Welfare and Community Development Programmes) has undertaken measures which do not comply with the life pattern of the tribal folk. They include construction of bathrooms, latrines, urinals etc. Under the tribal welfare and community development schemes, the Government has also established, midwifery centers. But these are far short of the actual needs of the people.

ANNEXURE: 3

RAGAS DENTAL COLLEGE & HOSPITAL
(Unit of Ragas Educational Society)
Recognized by the Dental Council of India, New Delhi
Affiliated to The Tamilnadu Dr. M.G.R. Medical University, Chennai
2/102, East Coast Road, Uthandi, Chennai - 600 119. INDIA.
Tele : (044) 24530002, 24530003-06. Principal (Dir) 24530001 Fax : (044) 24530009

To
The Village Panchayat Leader
Yelagiri Hills
Vellore District.

Sir,

This is to certify that Dr. Delfin Lovelina. F, is a bonafide Second year M.D.S (Public Health Dentistry) student of this college. She is doing the dissertation on "Oral Health Status and Treatment needs of Malayali tribes of Yelagiri Hills, Tamilnadu". Since she needs to examine the oral health people of Yelagiri Hills for her dissertation purpose. I will be thankful if you could allow her to do the dental screening.

Thanking you,

RAGAS DENTAL COLLEGE & HOSPITAL CHENNAI

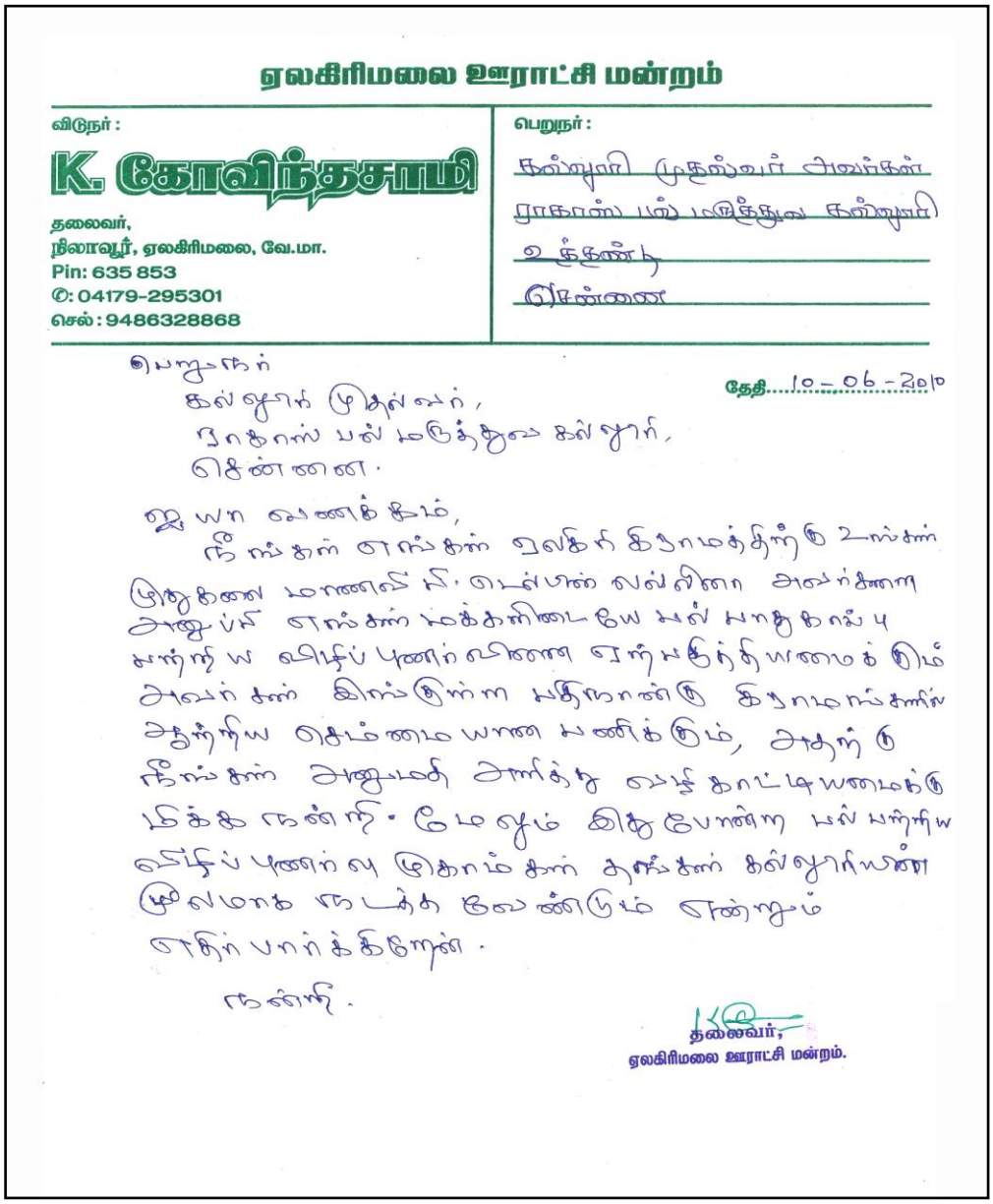
Date: 07.04.2010

Yours sincerely,

(Dr. S. RAMACHANDRAN)
PRINCIPAL
PRINCIPAL
RAGAS DENTAL COLLEGE AND HOSPITAL
UTHANDI, CHENNAI 600 119

ANNEXURE 4 (a):

LETER OF PERMISSION FROM THE VILLAGE PANCHAYAT LEADER, YELAGIRI HILLS.



ஏலகிரிமலை ஊராட்சி மன்றம்

விடுநர் :

K. கோவிந்தசாமி

தலைவர்,
நிலாவூர், ஏலகிரிமலை, வே.மா.
Pin: 635 853
✆: 04179-295301
செல் : 9486328868

பெறுநர் :

~~கல்வித்துறை முதன்மைக் அலுவலர்~~
~~ராகவேந்திரா மேல்நிலைப்பள்ளி~~ கல்வித்துறை
உத்தரவு
ஏலகிரி

தேதி 10-06-2010

பெறுநர்
கல்வித்துறை முதன்மைக் அலுவலர்,
ராகவேந்திரா மேல்நிலைப்பள்ளி கல்வித்துறை,
ஏலகிரி.

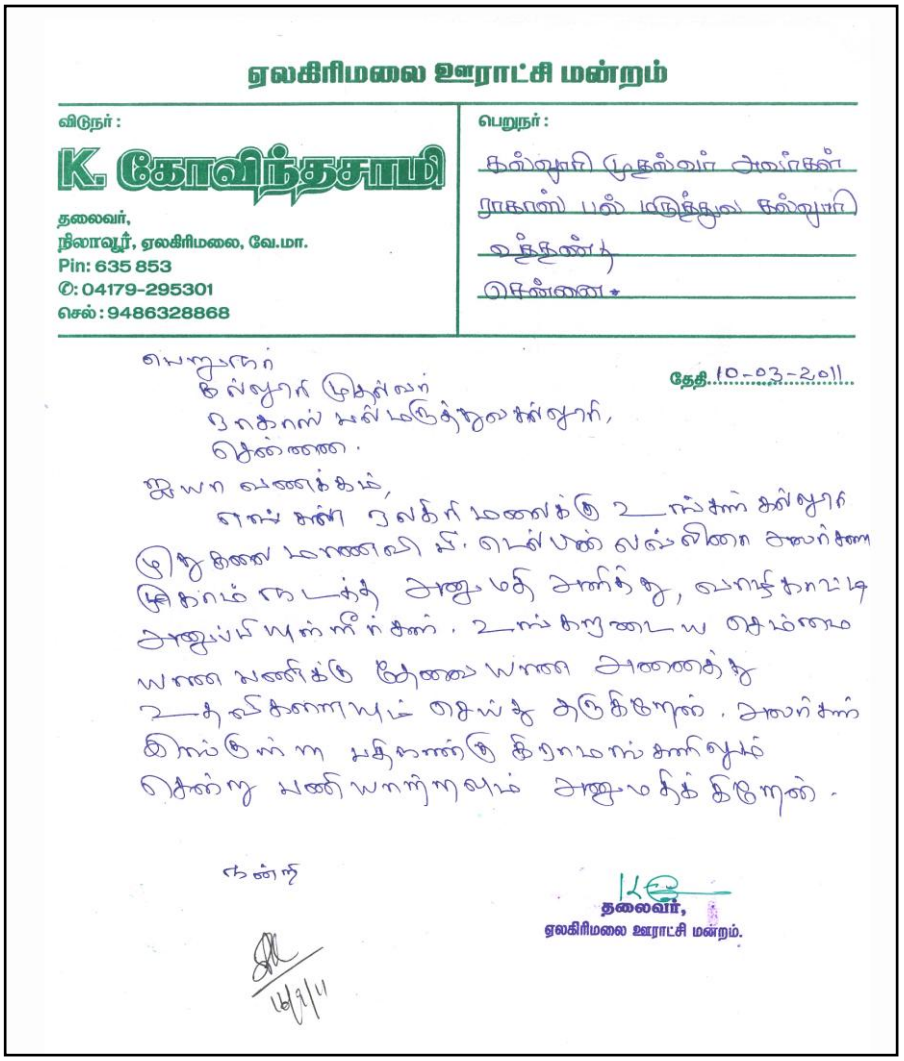
ஐயா வணக்கம்,
நீங்கள் எங்கள் ஏலகிரி கிராமத்திற்கு உங்கள் முதன்மை மாணவி M. பெர்பின் லவ்லினா அவர்களை அனுப்பி எங்கள் மக்களிடையே மேல்நாடுகளில் வெற்றிப் புரிந்த வரலாற்றை எடுத்துரைக்கும் அவர்கள் இங்கிருக்கும் மாணவர்களுக்கு கிராமங்களில் அதிகரிக்கும் தெம்மை பாரை பணிக்கும், அதற்கு நீங்கள் அனுமதி அளித்து வெற்றி காட்டியதைக்கு நிக்க நன்றி. மேலும் இது போன்ற மேல்நாடுகளில் வெற்றிப் புரிந்த முகாம்கள் தாங்கள் கல்வியாண்டு முழுமைக்கு நடத்த வேண்டும் என்றும் எதிர்பார்க்கிறோம்.

நன்றி.

தலைவர்,
ஏலகிரிமலை ஊராட்சி மன்றம்.

ANNEXURE 4 (b):

LETER OF ACKNOWLEDGEMENT FROM THE VILLAGE PANCHAYAT LEADER, YELAGIRI HILLS.



ஏலகிரிமலை ஊராட்சி மன்றம்

விடுநர் :

K. கோவிந்தசாமி

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Pin: 635 853
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செல்: 9486328868

பெறுநர் :

கல்வியாளர் முதல்வர் அவர்கள்
ராகவன் பல் மருத்துவ கல்லூரி
வந்தவாசி
சென்னை.

தேதி 10-03-2011

பெறுநர்
கல்வியாளர் முதல்வர்
ராகவன் பல் மருத்துவக் கல்லூரி,
சென்னை.

ஐயா வணக்கம்,

எங்கள் ஊர்க்கு மலைக்கு 2 — ம் தேதி கல்வியாளர் முதல்வர் மாணவி பி. பொன்பல் வங்கிய அவர்களை முகாம் நடத்த அனுமதி அளித்து, பொருத்தமாக அனுப்பி வைத்தீர்கள். 2 — ம் தேதியை அடைந்த மாணவர்களை மலை அணைத்து 2 — தேதிகளாகவும் நடைபெற்று அருகிலுள்ள அவர்கள் இலவசமாக பல் பரிசோதனை முகாம் நடத்தி முடித்தனர். அனுமதித்த தேதி மாணவர்களுக்கு நன்றி.

நன்றி

தலைவர்,
ஏலகிரிமலை ஊராட்சி மன்றம்.

16/3/11

ANNEXURE: 5

INFORMED CONSENT FORM

I ..... the undersigned hereby give my full consent for the performance of oral examination on myself as a part of the study being conducted by Dr.F.Delfin Lovelina, Postgraduate Student, Ragas Dental college, Chennai – 119, under the guidance of Dr.M.Shivakumar, MDS, Professor and Head, Dept of Public Health Dentistry, Ragas Dental College & Hospital, Chennai.

I also understand and accepted the study protocol and hereby give my full consent to participate in the study voluntarily, unconditionally and freely without fear or pressure in mentally sound and conscious state.

Participant's Signature

Date

..... ஆகிய நான் ராகாஸ் பல் மருத்துவக்கல்லூரி முதுகலை பல் மருத்துவ மாணவி டாக்டர். பி. டெல்பின் லவ்லினாவின் மலை வாழ் மக்களின் வாய் நலம் சார்ந்த இந்த ஆய்வில் எனக்கு வாய் பரிசோதனை மேற்கொள்ள முழு ஒப்புதல் அளிக்கிறேன்

இந்த ஆய்வு குறித்து எனக்கு தெரிவிக்கப்பட்ட நடைமுறைகளை புரிந்து கொண்டு எந்த தயக்கமோ யாருடைய வற்புறுத்தலோ இன்றி சுயநினைவுடன் முழு மனதுடன் இந்த ஆய்வில் பங்கேற்க ஒப்புதல் அளிக்கிறேன்.

பங்கு பெறுபவர் கையொப்பம்

நாள்

ANNEXURE: 6

QUESTIONNAIRE

An Assessment of Oral Health Status And Treatment Needs of the Malayalian Tribes in the Yelagiri Hills, Tamil Nadu.

1. Education

   a. No formal education b. Primary education

   c. Secondary education d. Higher secondary education

   e. Degree

2. Have you ever visited a dentist?

   a. yes b. No

3. If yes, Reason for last dental visit

   a. Check up b. Cleaning of teeth c. Toothache

   d. Filling of teeth. e. dentures

4. If no, what was the reason ?

   a. not interested b. use only traditional medicine c. lack of dentist nearby d. high cost e. Never had any dental problem

5. Do you use tobacco? Yes/ no, if yes

a. smoking b.smokeless c.both

6. Habit of smoking

Habit	Duration			Frequency/day					
Type	1-5 years	6-10 years	>10 years	1	2	3	4-5	6-10	>10

7. Habit smokeless tobacco?

Habit	Duration			Frequency				Time			
Type	1-5 years	6-10 years	>10 years	1/day	2/day	3/day	>3	<1/4 hr	¼ -1/2 hr	1/2- 1 hr	>1 hr

8. Do you Pouch quid in the oral cavity Yes / No

If yes, where do you place?

a.upper labial b. Upper right buccal c. Upper left buccal

d. Lower labial e. Lower right buccal f. Lower left buccal

9. Alcohol consumption

Duration : a. 1-5yrs b. 6-10yrs c. >10yrs

	How often do you drink this beverage?				
BEVERAGE QUANTITY	No. Of servings	Daily	weekly	monthly	yearly
30 ml					
60 ml					
90 ml					

Oral hygiene practices

10. How many times do you clean your teeth in a day?

a. Once b. Twice c. after each meal d. not at all

11. Materials used to brush your teeth?

a. tooth paste + tooth brush

b. Tooth powder + tooth brush

c. tooth paste + finger

d. tooth powder + finger

e. neem stick/ banyan stick

f. charcoal

g. brick powder

12. What method do you use to clean your teeth?

a. horizontal b. vertical c. both

Beliefs:

1. Teeth cleaning

   a. Loosens teeth b. Removes part of teeth c. Not healthy

   d. Promotes health

2. Will you undergo dental treatment any day in the week? Yes / No

   If no, which days? ……

3. Will you undergo dental treatment in the evenings? Yes / No

4. Do you think that extraction of upper tooth leads to blindness? Yes / No

5. Do you think that extraction of a tooth loosens others too ? Yes / No

6. Do you think spacing in between front teeth is luck? Yes / No

7. Do you think presence of extra teeth is luck? Yes / No

8. Do you think malaligned teeth is luck? Yes / No

9. Do you think cleaning teeth with salt whitens it? Yes / No

10. Do you think lemon juice makes teeth white? Yes / No

11. Do you think dental treatment is always painful? Yes / No

12. Do you think placing clove in decayed tooth relieves pain and kills germs?

    Yes / No

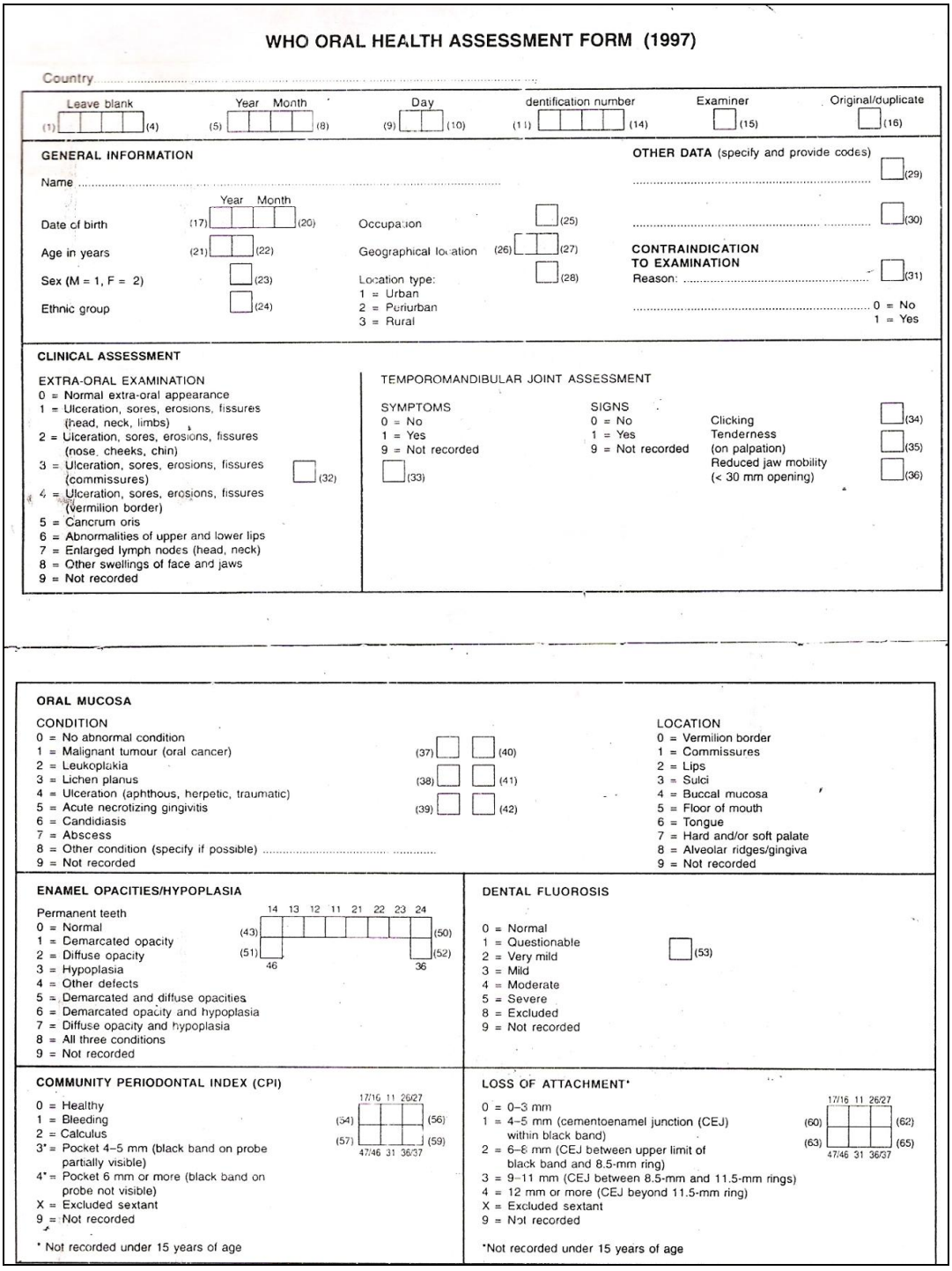
13. Do you think burying milk teeth in soil will cause the permanent teeth to erupt in its normal position? Yes / No

14. How do you rate your oral health? :

    1) Good 2) Fair 3) Poor

ANNEXURE: 7

WHO PROFORMA



WHO ORAL HEALTH ASSESSMENT FORM (1997)

Country .....

Leave blank (1) (4) | Year Month (5) (8) | Day (9) (10) | dentification number (11) (14) | Examiner (15) | Original/duplicate (16)

GENERAL INFORMATION

Name .....

Date of birth — Year Month (17) (20)

Age in years (21) (22)

Sex (M = 1, F = 2) (23)

Ethnic group (24)

Occupation (25)

Geographical location (26) (27)

Location type: (28)
1 = Urban
2 = Periurban
3 = Rural

OTHER DATA (specify and provide codes)

..... (29)

..... (30)

CONTRAINDICATION TO EXAMINATION

Reason: ..... (31)

..... 0 = No 1 = Yes

CLINICAL ASSESSMENT

EXTRA-ORAL EXAMINATION
0 = Normal extra-oral appearance
1 = Ulceration, sores, erosions, fissures (head, neck, limbs)
2 = Ulceration, sores, erosions, fissures (nose, cheeks, chin)
3 = Ulceration, sores, erosions, fissures (commissures) (32)
4 = Ulceration, sores, erosions, fissures (vermilion border)
5 = Cancrum oris
6 = Abnormalities of upper and lower lips
7 = Enlarged lymph nodes (head, neck)
8 = Other swellings of face and jaws
9 = Not recorded

TEMPOROMANDIBULAR JOINT ASSESSMENT

SYMPTOMS
0 = No
1 = Yes
9 = Not recorded (33)

SIGNS
0 = No
1 = Yes
9 = Not recorded

Clicking (34)
Tenderness (on palpation) (35)
Reduced jaw mobility (< 30 mm opening) (36)

ORAL MUCOSA

CONDITION
0 = No abnormal condition
1 = Malignant tumour (oral cancer)
2 = Leukoplakia
3 = Lichen planus
4 = Ulceration (aphthous, herpetic, traumatic)
5 = Acute necrotizing gingivitis
6 = Candidiasis
7 = Abscess
8 = Other condition (specify if possible) .....
9 = Not recorded

(37) (40)
(38) (41)
(39) (42)

LOCATION
0 = Vermilion border
1 = Commissures
2 = Lips
3 = Sulci
4 = Buccal mucosa
5 = Floor of mouth
6 = Tongue
7 = Hard and/or soft palate
8 = Alveolar ridges/gingiva
9 = Not recorded

ENAMEL OPACITIES/HYPOPLASIA

Permanent teeth
0 = Normal
1 = Demarcated opacity
2 = Diffuse opacity
3 = Hypoplasia
4 = Other defects
5 = Demarcated and diffuse opacities
6 = Demarcated opacity and hypoplasia
7 = Diffuse opacity and hypoplasia
8 = All three conditions
9 = Not recorded

14 13 12 11 21 22 23 24
(43) (50)
(51) (52)
46 36

DENTAL FLUOROSIS

0 = Normal
1 = Questionable
2 = Very mild
3 = Mild
4 = Moderate
5 = Severe
8 = Excluded
9 = Not recorded

(53)

COMMUNITY PERIODONTAL INDEX (CPI)

0 = Healthy
1 = Bleeding
2 = Calculus
3* = Pocket 4–5 mm (black band on probe partially visible)
4* = Pocket 6 mm or more (black band on probe not visible)
X = Excluded sextant
9 = Not recorded

17/16 11 26/27
(54) (56)
(57) (59)
47/46 31 36/37

* Not recorded under 15 years of age

LOSS OF ATTACHMENT*

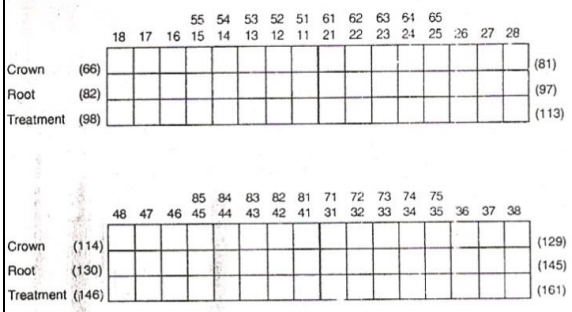
0 = 0–3 mm
1 = 4–5 mm (cementoenamel junction (CEJ) within black band)
2 = 6–8 mm (CEJ between upper limit of black band and 8.5-mm ring)
3 = 9–11 mm (CEJ between 8.5-mm and 11.5-mm rings)
4 = 12 mm or more (CEJ beyond 11.5-mm ring)
X = Excluded sextant
9 = Not recorded

17/16 11 26/27
(60) (62)
(63) (65)
47/46 31 36/37

*Not recorded under 15 years of age

DENTITION STATUS AND TREATMENT NEED

Identification number



Primary teeth *Crown*	Permanent teeth *Crown/Root*		STATUS
A	0	0	Sound
B	1	1	Decayed
C	2	2	Filled, with decay
D	3	3	Filled, no decay
E	4	—	Missing, as a result of caries
—	5	—	Missing, any other reason
F	6	—	Fissure sealant
G	7	7	Bridge abutment, special crown or veneer/implant
—	8	8	Unerupted tooth, (crown)/unexposed root
T	T	—	Trauma (fracture)
—	9	9	Not recorded

TREATMENT
0 = None
P = Preventive, caries-arresting care
F = Fissure sealant
1 = One surface filling
2 = Two or more surface fillings
3 = Crown for any reason
4 = Veneer or laminate
5 = Pulp care and restoration
6 = Extraction
7 = Need for other care (specify).....
8 = Need for other care (specify).....
9 = Not recorded

PROSTHETIC STATUS

Upper Lower (162) (163)

0 = No prosthesis
1 = Bridge
2 = More than one bridge
3 = Partial denture
4 = Both bridge(s) and partial denture(s)
5 = Full removable denture
9 = Not recorded

PROSTHETIC NEED

Upper Lower (164) (165)

0 = No prosthesis needed
1 = Need for one-unit prosthesis
2 = Need for multi-unit prosthesis
3 = Need for a combination of one- and/or multi-unit prostheses
4 = Need for full prosthesis (replacement of all teeth)
9 = Not recorded

DENTOFACIAL ANOMALIES

DENTITION

(166) (167) Missing incisor, canine and premolar teeth—maxillary and mandibular—enter number of teeth

SPACE

(168) Crowding in the incisal segments:
0 = No crowding
1 = One segment crowded
2 = Two segments crowded

(169) Spacing in the incisal segments:
0 = No spacing
1 = One segment spaced
2 = Two segments spaced

(170) Diastema in mm

(171) Largest anterior maxillary irregularity in mm

(172) Largest anterior mandibular irregularity in mm

OCCLUSION

(173) Anterior maxillary overjet in mm

(174) Anterior mandibular overjet in mm

(175) Vertical anterior openbite in mm

(176) Antero-posterior molar relation:
0 = Normal
1 = Half cusp
2 = Full cusp

NEED FOR IMMEDIATE CARE AND REFERRAL

Life-threatening condition (177)
Pain or infection (178)
Other condition (specify)..... (179)

0 = Absent
1 = Present
9 = Not recorded

Referral (180)
0 = No
1 = Yes
9 = Not recorded

NOTES